INDIA RUBBER WORLD

JULY, 1942

Newsletter No. 7 *PUBLISHED BY RUBBER CHEMICALS DIVISION OF* DU PONT *JULY, 1942*

Protection of Rubber Products Against Sunlight and Oxidation is Vital

ONE OF THE WORST ENEMIES of rubber products is the actinic rays of a scorching summer sun. Rubber parts must be made to have the longest possible life under all types of service conditions, and, under present conditions, even the best sunlight protection is barely good enough. Where exposure to sunlight is concerned, protection can only be afforded by covering the exposed surfaces with a *continuous* protective film capable of filtering out the harmful actinic rays. The most practical method of achieving this desirable result is to incorporate Heliozone into the unvulcanized stock.

HELIOZONE is a mixture of specially selected waxy materials having a specific gravity of 0.90. It melts at normal processing temperatures and thus disperses easily when added at any time during the mixing operation. Resistance to sun-checking is afforded by Heliozone because it blooms to the surface of the rubber product after curing, to form a smooth, continuous, plastic film which cannot be scraped off. The protective film is invisible to the eye. Because of the unusual properties of the special waxes used in the manufacture of Heliozone, it is effective under all weather conditions. The film does not melt or dissolve in the rubber at hot summer temperatures; and it retains its flexibility and elasticity even at cold winter temperatures.

In stocks containing large proportions of reclaimed rubber, Heliozone has the added value of improving appearance.

Since Heliozone functions by blooming to the surface, the amount required to provide protection depends on its solubility in the compound at the temperature of service. A good rule for determining the amount of Heliozone required is to use one volume per 100 volumes of rubber and two volumes per 100 volumes of compounding ingredients present in the compound.

OXIDATION RESISTANCE—Although an excellent sun-checking inhibitor, Heliozone is not an antioxidant and therefore should always be used in conjunction with a good antioxidant. Where discoloration is unimportant we recommend the use of 1.0% Neozone A with Heliozone.

NEOZONE A is an all-purpose antioxidant. It is very soluble in rubber and may be used in amounts up to 5.0% without blooming. Normally 1.0% on the rubber provides excellent protection against ordinary aging conditions. Neozone A also provides protection against heat and fatigue deterioration.

COPPER IS OXIDATION CATALYST—The catalytic effect of copper on oxidation has long been known. Copper Inhibitor X-872-A reacts with copper that may be present in the rubber composition to form a harmless inert compound that no longer possesses any catalytic effect on the aging of the vulcanizate. The value of Copper Inhibitor X-872-A in counteracting copper is illustrated in the accompanying data.

Compound 400	-1975	-1976	-1977
Pale Crepe	100.	100.	100.
Zinc Oxide	100.	100.	100.
Lithopone	20.	20.	20.
Stearic Acid	1.	1.	1.
DOTG	0.75	0.75	0.75
NEOZONE D	1.	1.	1.
Copper Stearate	—	0.05*	0.05*
COPPER INHIBITOR X-872-A	—	—	1.
Sulfur	3.	3.	3.

Cure: 45 minutes at 287 °F.
*Equivalent to 0.005 part copper.

TEST DATA

Original			
Tensile Strength psi	3600	3450	3500
Elongation at break %	660	670	650

After 7 days in oxygen at 70° C. and 300 psi pressure			
Tensile Strength psi	2450	Deteriorated	2225
Elongation at break %	620	"	585

In order that rubber products may give the ultimate in service during this critical period, serious consideration should be given to the use of Copper Inhibitor X-872-A whenever there is a chance of traces of copper being present.

Through the Mill

MBT AND MBTS—*We are pleased to announce the addition of MBT (mercapto-benzothiazole) and MBTS (benzothiazyl-disulfide) to our line of rubber accelerators. Both are available for prompt shipment from our plant at Carney's Point, New Jersey, as well as from our branch warehouses in Akron, Ohio; Boston, Massachusetts; Chicago, Illinois; Los Angeles, California; San Francisco, California and Trenton, New Jersey. The Du Pont Rubber Laboratory and our technical representatives stand ready to assist in adapting these accelerators to your use.*

PACKAGES—*A portion of our Neoprene Type GN is now being packed in 50-lb., multiple-ply, paper bags rather than the conventional fiber drum containing 150 lbs. net. In addition to conserving materials, we believe you will find 50-lb. bags more convenient to handle in your plant. We expect in the near future to be shipping all Neoprene Type GN in this new package.*

WIRE INSULATION AND JACKETS—*Amendment No. 2 to the War Production Board's Supplementary Order M-15-B-1 restricts the volume of rubber and scrap rubber that may be used in compounds for both wire insulation and jackets. A recent informal report suggesting compounds that meet these requirements is "Wire Insulation and Jacket Stocks to Meet War Production Board Supplementary Order M-15-B-1-Rubber Amendment No. 2."*

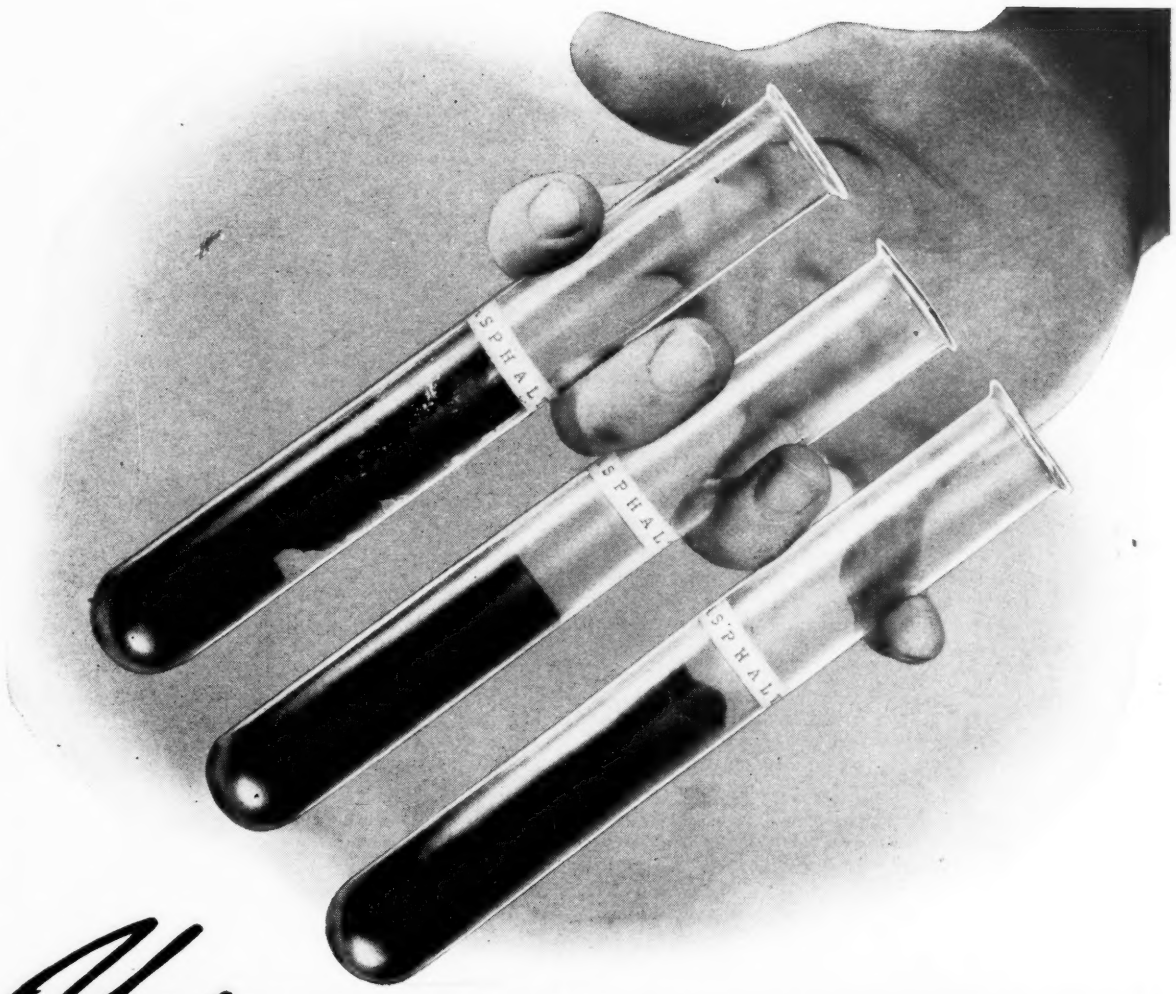
ABRASION RESISTANCE—*Many Government specifications include the measurement of abrasion resistance by the Bureau of Standards Abrasion Machine. For those who are not equipped with this apparatus, we have prepared a brief report correlating the results obtained with the Bureau of Standards and Du Pont Abraders.*

RUBBER CHEMICALS DIVISION

Wilmington DU PONT Delaware

INDIA RUBBER WORLD, July, 1942, Vol. 106, No. 4. Published monthly by BILL BROTHERS PUBLISHING CORP. Printing office, Philadelphia, Pa. Editorial and advertising offices, 386 Fourth Avenue, New York, N. Y., U. S. A. Entered as second-class matter October 5, 1889, at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription, United States and Mexico, $3.00 per year; all other countries, $4.00; single copies, 35 cents.

TECHNOLOGY DEPT



Yes, YOU CAN GET HYDROCARBON M.R.

Are you finding it difficult to get sufficient Hydrocarbon M.R. to meet your needs?

Wishnick-Tumpeer, Inc., offers prompt delivery from a complete line that meets the most exacting demands. Two grades of Witco Hydrocarbon M.R. may be obtained without delay. One is Black Diamond, for highly loaded compounds. The other is No. 38, which has the hardness of Black Diamond but a lower melting point. It produces a more plastic grade of rubber during the mixing and processing operations. Both grades are offered in granular and solid form.

In addition to these, other grades are available for special purposes. And we are equipped to produce still other grades to fill certain requirements not covered by those we have in stock. Because we have on hand a variety of crudes which have a wide range of special properties desirable in rubber compounding, we can give you a flexible service in devising hydrocarbons suitable for your formulations. All such Witco products are in high demand for war production purposes, but because of our modern, up-to-the-minute plants and methods, we are in a position to give prompt delivery on other orders.

Our staff will gladly assist you in selecting the right grade of Witco Hydrocarbon M.R. for your specific requirements. Get in touch with Wishnick-Tumpeer, Inc., TODAY.

WISHNICK-TUMPEER, INC.

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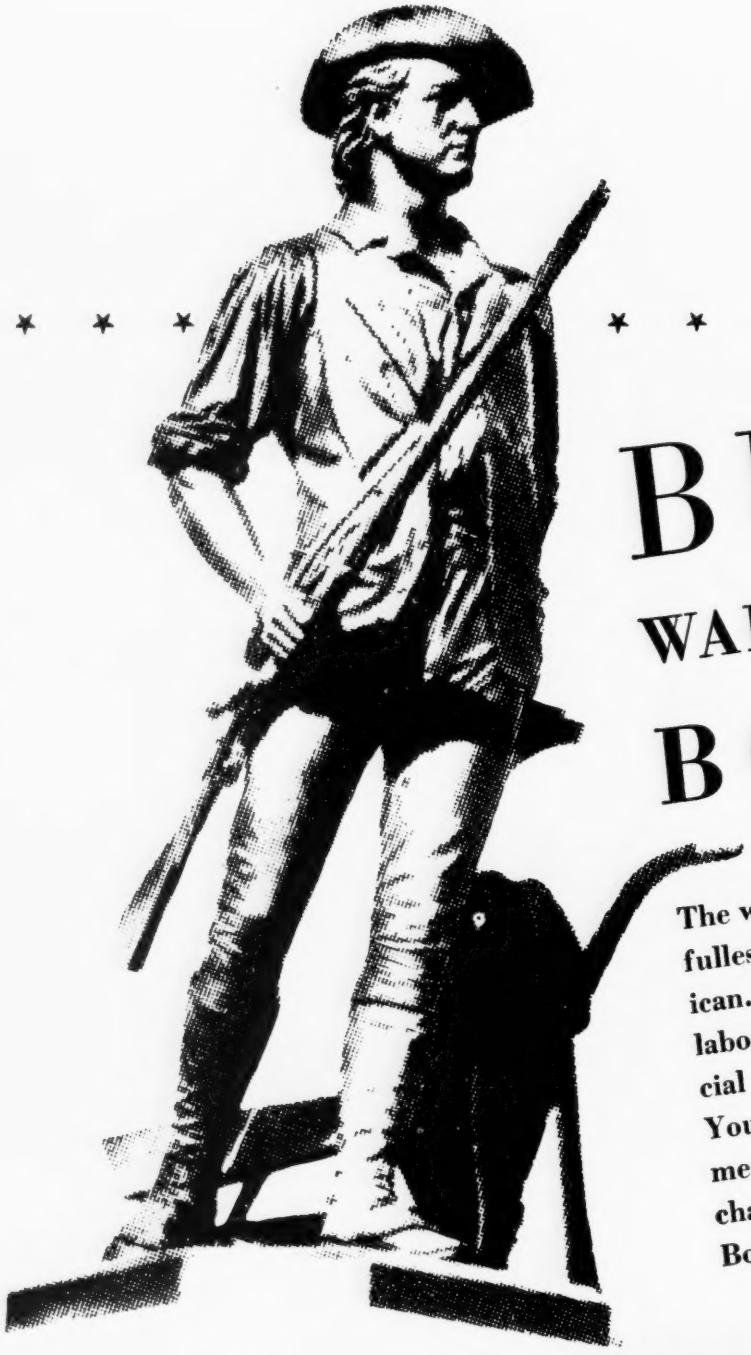
New York, 295 Madison Ave. • Boston, 141 Milk St. • Chicago, Tribune Tower • Cleveland, 616 St. Clair Ave., N. E.
Witco Affiliates: Witco Oil & Gas Company • The Pioneer Asphalt Company • Panhandle Carbon Company
Foreign Office, London, England.



BUY WAR SAVINGS BONDS

The war effort is worthy of the fullest support of every American. However, long hours of labor are not enough . . . financial support, too, is needed. You will help your Government and yourself if you purchase War Savings Stamps and Bonds on a *regular schedule.*

The nation's immediate needs for hydraulic presses and equipment still engage practically all of our efforts and facilities. However, R. D. Wood engineers will continue to cooperate to the fullest possible extent in the solution of your particular hydraulic press problems.

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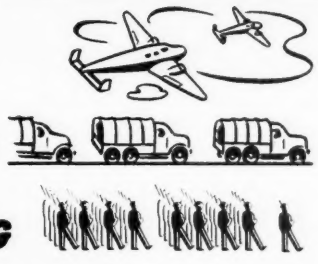
- Best for Oxygen and for Heat Aging
- Slight Plasticizing Effect
- Easily Dispersed
- Non-Blooming
- Effective in Combinations with Aminox Betanox and BLE Powder

KEEP 'EM FLYING
KEEP 'EM ROLLING
KEEP 'EM MARCHING



WITH BLE

PROCESS—ACCELERATE—PROTECT with Naugatuck Chemicals

Naugatuck Chemical
DIVISION OF UNITED STATES RUBBER COMPANY
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Unless He Connects

SWINGING *at* a baseball never won a game. Someone has to *hit the ball.*

And someone has to *"hit the ball"* when you need emergency service on solvents.

Why the Skelly Oil Company is in a better position to *"hit the ball"* for you is a story of sources of supply, refining facilities, distribution organization, and *many years' experience at the bat!* The Skellysolve reputation for coming through was not made by fanning out in the pinches.

Take a moment now to drop a line and get the information about Skellysolve and Skellysolve Service. The day may come—and most likely will—when you'll be mighty glad you did.

Phone, write, or wire the address below.

SKELLYSOLVE
in the
RUBBER INDUSTRY

There are six different types of Skellysolve which are especially adapted to various uses in the rubber industry, for making rubber cements, and for many different rubber fabricating operations. Skellysolve offers many advantages over benzol, rubber solvent gasoline, toluol, carbon tetrachloride, etc. It will pay you to investigate Skellysolve. Write today.

SKELLY

SKELLYSOLVE

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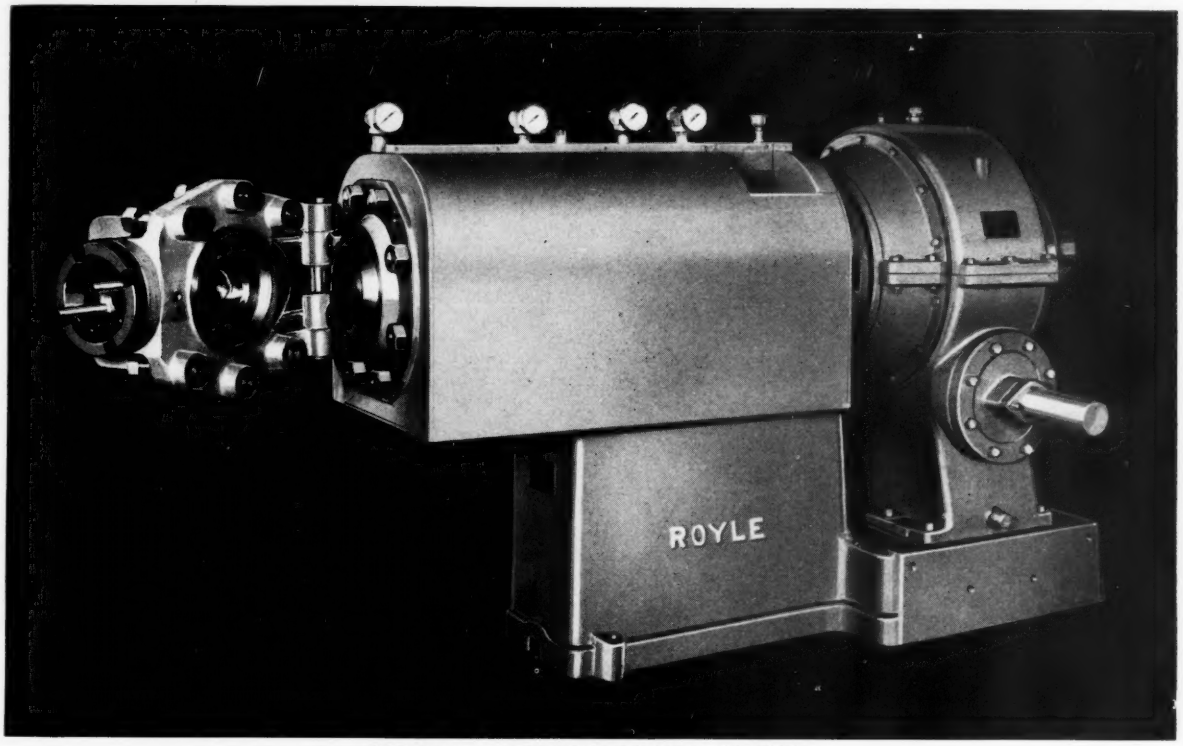

THE ROYLE 6" PLASTICS INSULATING EXTRUDER

TRACKING DOWN DELAYS

Delays in materials and production — arch enemies of our defense effort — are being systematically done away with at John Royle & Sons. It is stern business — calling for stern measures — and great strides are being made in the right direction.

But until our present emergency is past, we can expect delays — disappointments and curtailment of some industries. To our many good friends and customers, we want to pledge our efforts in holding these delays to a minimum. When they must occur, we ask your understanding cooperation.

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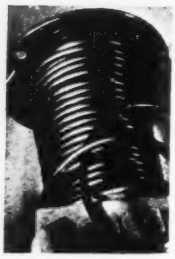
ROYLE'S 62 ND. YEAR OF EXTRUDING MACHINE MANUFACTURE

Photo By U. S. Army Signal Corps

GASTEX Helps Wire Jackets Handle Tough Assignments



Wire jackets used for portable telephone, telegraph, radio, and electric current service in the field by our Army Signal Corps must stand up under harsh treatment when wires are hauled around trees, rocks, and sharp corners and dragged through oil and grease, arch enemies of rubber.

Most compounders prefer GASTEX or PELLETEX as reenforcing agents for wire designed for such rough use because these popular, special process blacks have been proved superior in resisting abrasion and the action of solvents. Splendid aging properties, moreover, enable GASTEX and PELLETEX Compounds to resist ozone and therefore outlast other compounds without cracking. Easy processing is another factor contributing to the popularity of GASTEX and PELLETEX for insulated wire.

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Resistance to aging
Dielectric strength

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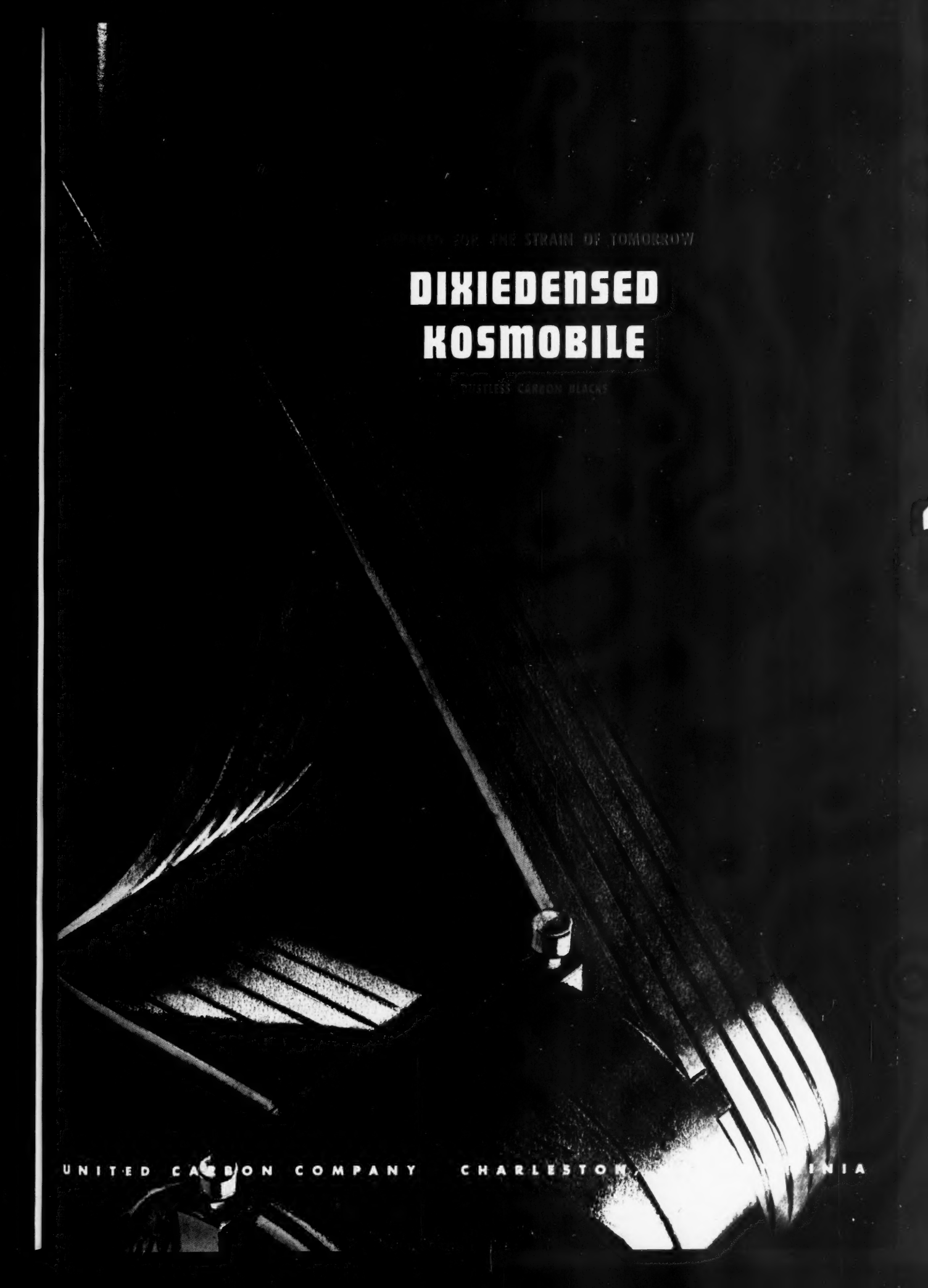
BUILT TO FIT THE STRAIN OF TOMORROW
DIXIEDENSED
KOSMOBILE
DUSTLESS CARBON BLACKS
UNITED CARBON COMPANY CHARLESTON

DIXIEDENSED AND KOSMOBILE, THROUGH EXPERIENCE,

ARE RELIED ON TO PRODUCE PRODUCTS THAT ARE WELL

PREPARED FOR THE STRAIN OF TOMORROW.

SAVE RUBBER STOCKS, LINER FABRICS, TIME WASTE AND MONEY

with the

CAPITOL PROCESS LINER TREATMENT

Rubber stocks are ***vital*** in your war effort and any loss or damage through adhesion means unredeemable waste of materials, time and money.

The CAPITOL PROCESS of Liner Treatment not only prevents adhesion of rubber stocks but preserves and lengthens the life of the cotton fabrics, thus reducing necessary purchases of piece goods.

CAPITOL LINERS have proved their value in a great many plants. If you will send us a 50- or 100-yard liner, we will treat it gratis so you can test it out. You will be pleased with the all-around savings you will effect in rubber and in your purchases of cotton piece goods.

Here is your chance to conserve stocks, prevent losses and at the same time lower costs.

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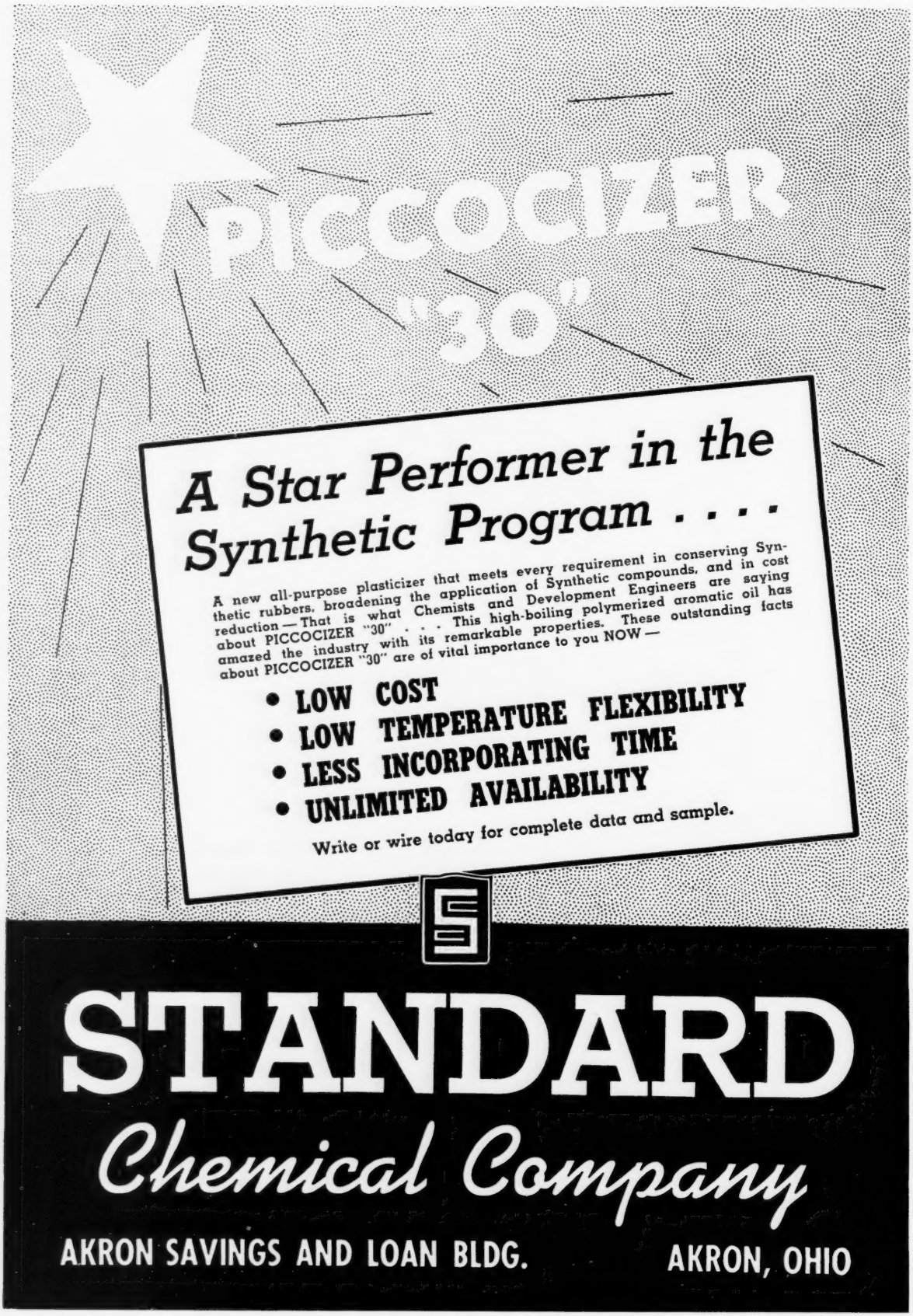
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"30"
A Star Performer in the Synthetic Program . . . .
A new all-purpose plasticizer that meets every requirement in conserving Synthetic rubbers, broadening the application of Synthetic compounds, and in cost reduction — That is what Chemists and Development Engineers are saying about PICCOCIZER "30" . . . This high-boiling polymerized aromatic oil has amazed the industry with its remarkable properties. These outstanding facts about PICCOCIZER "30" are of vital importance to you NOW —
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Write or wire today for complete data and sample.
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When the new program means tougher mixing schedules and more speed, your Banbury is the key to profit on your entire production schedule . . . Time can be saved by Interstate Service either in redesigning and rebuilding your Banbury for 2-speed operation, or in repairing and hard-surfacing rotors and mixing chambers to resist longer the wear and tear of hard, fast mixing service . . . Write, wire or phone us today!

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Conserve Rubber with
ZINC OXIDE

Spring 1941 —— With Rubber Plentiful, You Patriotically Conserved Zinc Oxide. The urgency of conserving those types of zinc oxide which are produced from slab zinc was explained one year ago in the pages of this publication. As a supplier of zinc oxide for the rubber industry, we outlined the effect of the then National Defense Program upon this strategic metal, zinc, which serves our country in so many ways. Zinc oxide made from metal is still scarce. But —

Today —— Zinc Oxide Made From Ore Can Help You To Patriotically Conserve Rubber. Because of its unique properties, zinc oxide offers the best means for conserving crude rubber. For more zinc oxide can be used to replace crude rubber with less resultant reduction in the physical properties — **tensile strength, elongation, elasticity,** and **resilience** — than any other pigment. Such compounds also have the **highest heat resistance** known. And —

Tomorrow —— Higher Zinc Oxide Compounds Will Continue To Mean Better Performance. You have the opportunity to conserve rubber and improve the performance of your products by using zinc oxide. We shall be glad to contribute our advice if we can be of assistance.

THE NEW JERSEY ZINC COMPANY

160 FRONT STREET, NEW YORK

New Jersey Zinc

UNIFORM QUALITY ZINC OXIDES

THE HORSE HEAD BRANDS

COMPOUNDING INGREDIENTS *for* RUBBER

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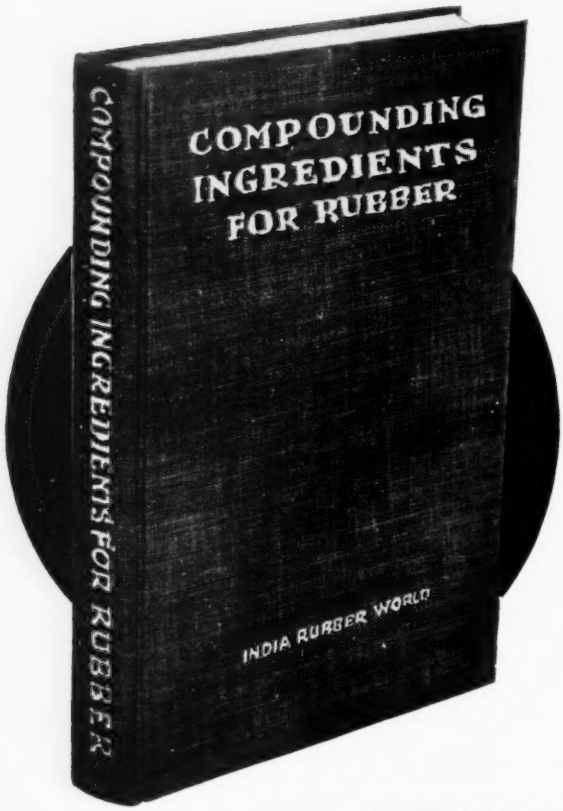

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INDIA RUBBER WORLD

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The following PICCO Coal Tar Polymers and Resins, having the specific qualities needed for softeners, are available now!

Manufactured under rigid quality control, you can specify PICCO Products with absolute assurance of complete satisfaction.

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420-S	for light colored, intermediate hardness stocks
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Please refer inquiries to Standard Chemical Co., Akron Savings and Loan Bldg., Akron, Ohio, sole representatives to the rubber industry.

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MAKES RUBBER GO FARTHER

Calcene is a re-inforcing Calcium Carbonate pigment of extremely fine particle size. For eight years it has proved its value in making a limited quantity of rubber go farther in terms of finished goods. With today's rationing of rubber, Calcene can be more useful to you than ever.

Among virtually all the materials in its class, Calcene can be loaded at the highest volume with the least deterioration in physical properties. It assures highly loaded stock of low volume cost but with excellent resistance to tear, abrasion and flex cracking.

As supplementary fillers for stiff stocks we suggest the use of clay along with Calcene. For better grade stocks, Silene is recommended.

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Columbia Chemical Division

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TO DRIVE YOUR RUBBER MACHINERY

PUMPS · DRYERS
TURBINES · COOLERS
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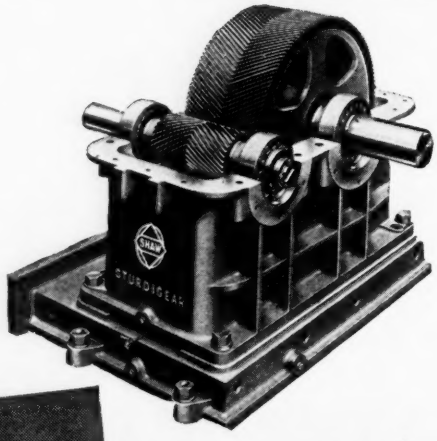

WASHERS · CRACKERS
MIXERS · WARMERS
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- DESIGNED FOR SERVICE
- ACCURATE WORKMANSHIP
- RELIABILITY & LONG LIFE
- MATERIALS OF HIGHEST QUALITY

FRANCIS SHAW & CO., LTD.
MANCHESTER, 11, ENGLAND

To offset the extra heat generating properties of reclaim in heavy-duty tires, Continental has developed a new type black. Continental "AA" maintains just the right balance between wear resistance in the tread compound and heat generation in the tire itself.

The low heat generating characteristics of Continental "AA" are the result of special processing, and have been thoroughly tested in actual reclaim formulations. Proven superior to standard channel blacks, Continental "AA" meets a vital need for military, truck and bus tires formulated partially with reclaim that must "stand up" under the severest operating conditions and in very hot climates.

IT'S EASIER PROCESSING, TOO!

Continental "AA" is easier processing, too—another advantage over standard blacks customarily used for passenger car tires, and particularly welcome in wartime production.

To meet the demand for this type black, Continental has rearranged its production set-up and now can supply as much as may be required. The same high quality that characterizes all grades of Continental Black applies to this new low heat generating type. Send for samples—find out how completely Continental "AA" fills your needs.

TRY IT IN YOUR BUNA S FORMULATIONS

Experimenting with this type synthetic rubber? Now is an excellent time to investigate the characteristics of Continental "AA" in your Buna S formulations. Samples for this purpose are also available on request.

Continental CARBON COMPANY

295 MADISON AVENUE • NEW YORK, N. Y.

Akron Sales Office: Peoples Bank Building, Akron, Ohio • SALES REPRESENTATIVES: Ernest Jacoby & Co., Boston, Mass. • Marshall Dill, Los Angeles and San Francisco, Calif.

Scrap Pile to Battle Line...*Faster*

- "Reclaim" Cooking Time Halved
- Devulcanizer Output Doubled

with SUN RUBBER PROCESSING OIL

For a full year engineers of a large plant, working 100% on war production of natural, synthetic and reclaim rubber, experimented with all kinds of plasticizers. Circo Light Rubber Processing Oil was tested, proved and approved on results and merit alone — it enabled them to meet required specifications and speed-up production.

One example of the effectiveness of Circo Light was proved when Sun Oil Engineers — those Doctors of Industry — applied it in the processing of a particular pan reclaim. Formerly it required a 20-hour cook with 2 hours to unload and reload the devulcanizer. With Circo Light cooking time is only 10 hours. Batches per day have been doubled . . . devulcanizers are now turning out twice the amount of material.

If you have a similar job to do let Sun Products and Sun's Doctors of Industry help you in the march of production to victory. These technical men are ready, willing and able to help you improve production . . . and for proof of what they have accomplished for the rubber industry write for your copy of "Helping Industry Help America."

SUN OIL COMPANY • PHILADELPHIA

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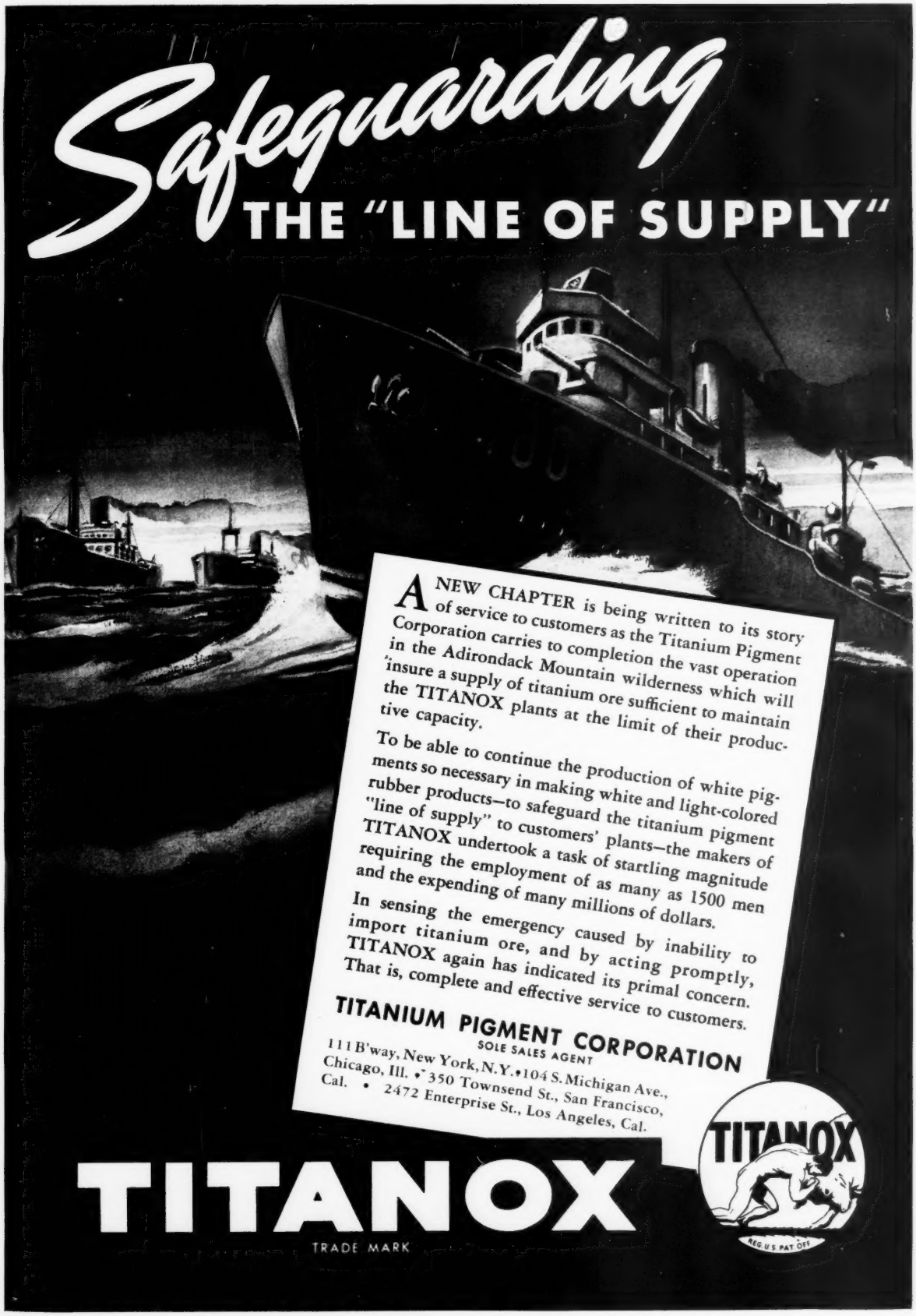
SUNOCO

SUN PETROLEUM PRODUCTS.. HELPING INDUSTRY HELP AMERICA


Safeguarding
THE "LINE OF SUPPLY"
A NEW CHAPTER is being written to its story of service to customers as the Titanium Pigment Corporation carries to completion the vast operation in the Adirondack Mountain wilderness which will insure a supply of titanium ore sufficient to maintain the TITANOX plants at the limit of their productive capacity.
To be able to continue the production of white pigments so necessary in making white and light-colored rubber products—to safeguard the titanium pigment "line of supply" to customers' plants—the makers of TITANOX undertook a task of startling magnitude requiring the employment of as many as 1500 men and the expending of many millions of dollars.
In sensing the emergency caused by inability to import titanium ore, and by acting promptly, TITANOX again has indicated its primal concern. That is, complete and effective service to customers.
TITANIUM PIGMENT CORPORATION
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TRADE MARK
TITANOX
REG. U.S. PAT. OFF.

FIT TO FIGHT!

To win this war, we've got to keep strong and husky and well—all of us must. This is why Uncle Sam puts health needs on a par with war needs. Rubber is being conserved in every possible way, but the health of our people is not being forgotten.

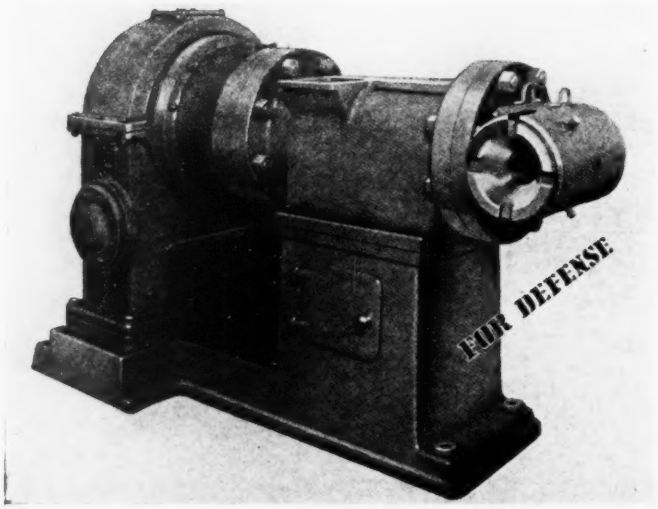
To help save rubber, the Davol line of sundries has been simplified—so that there may continue to be an adequate supply of the essential items.

. . . And today, "know how" in compounding counts more than ever!

DAVOL RUBBER COMPANY
PROVIDENCE RHODE ISLAND

6 in. INSULATOR and EXTRUDER

for Continuous Insulation of Wire and Cable



Another N.E. Wire Insulator goes into defense work, designed to do one big rubber insulation job, but ready to handle any size of wire from 16 Ga. up to 3½" —can be converted to handle plastics with a minimum of change. The extra in-built mechanical strength assures continuous operation under peak production. N.E. builds the complete line of rubber working machinery. Put your wire insulation problem up to N.E.'s 30 years of specialized experience.

NATIONAL-ERIE
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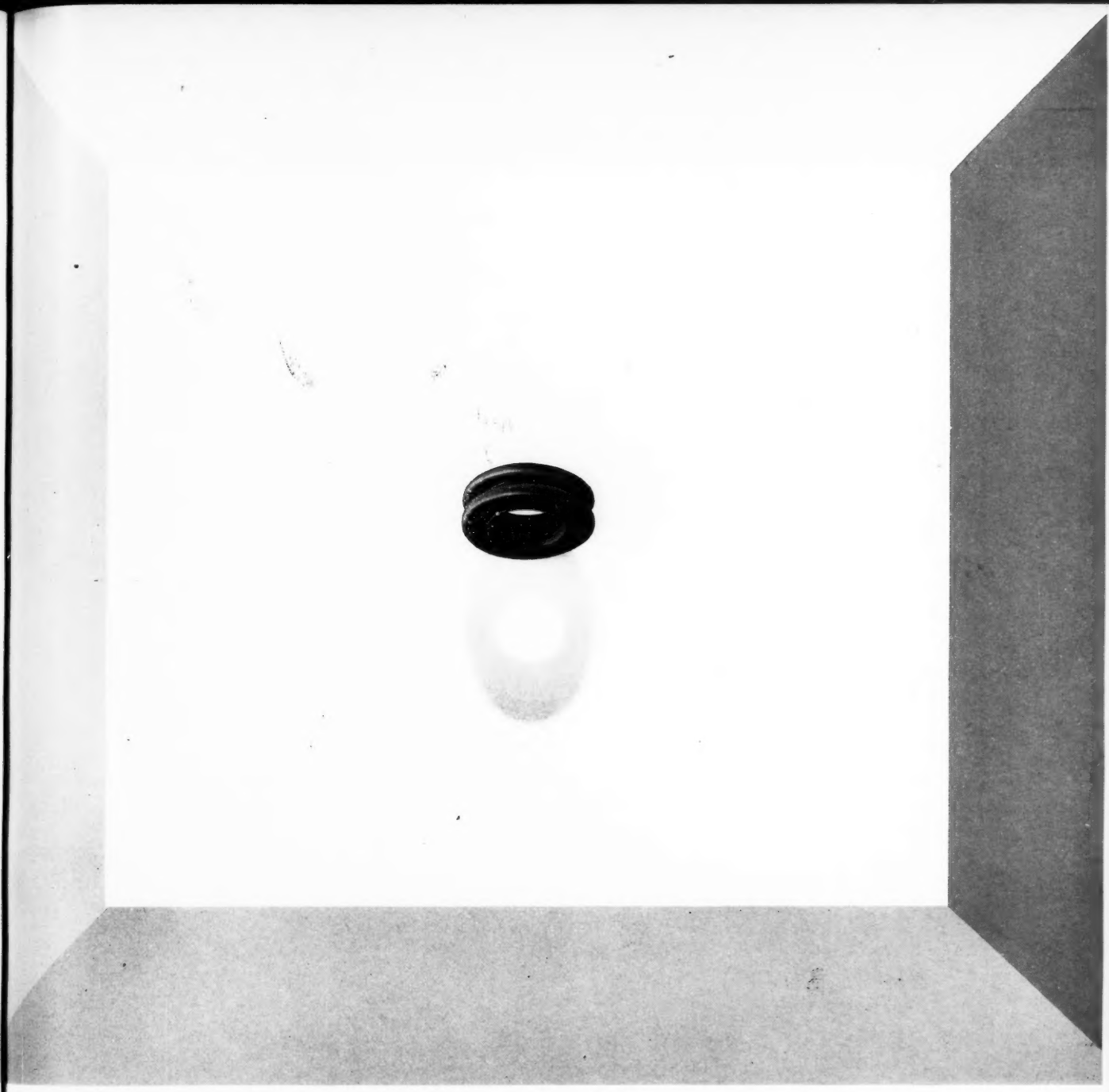

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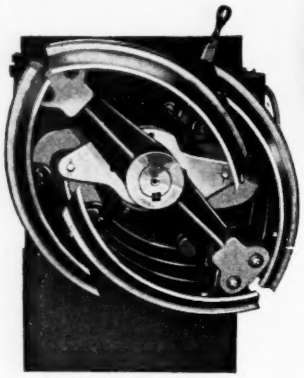

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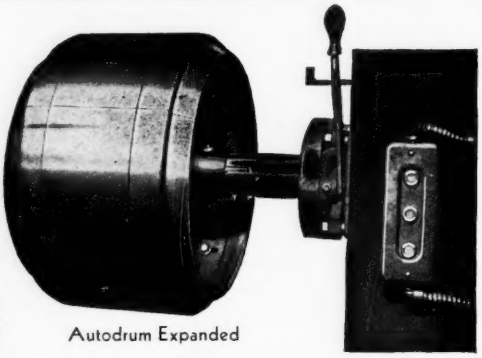

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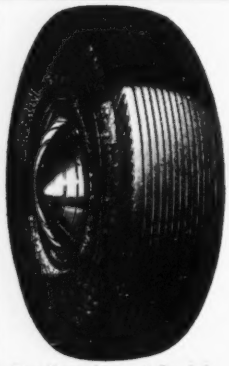

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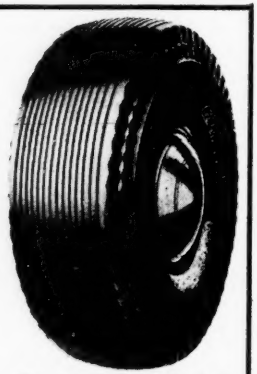

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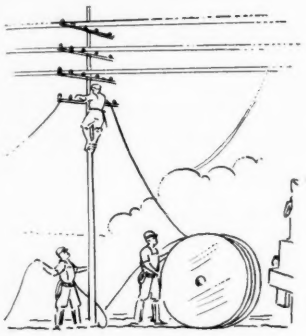

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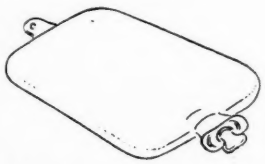

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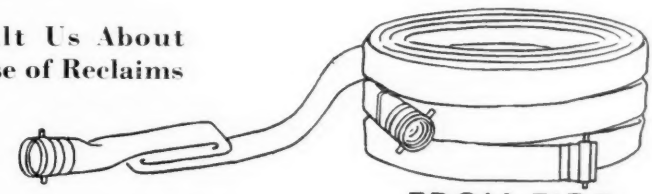

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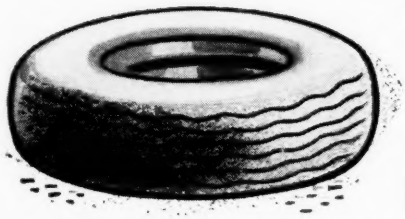

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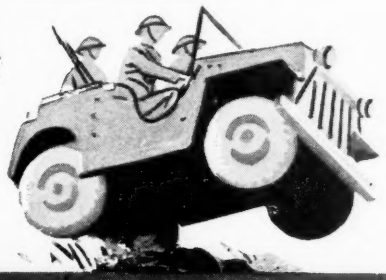

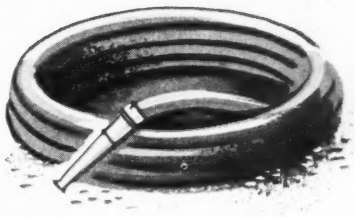

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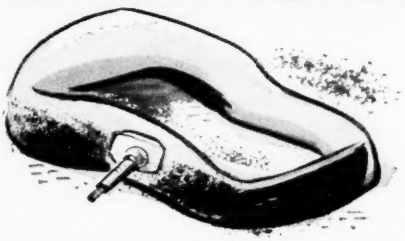

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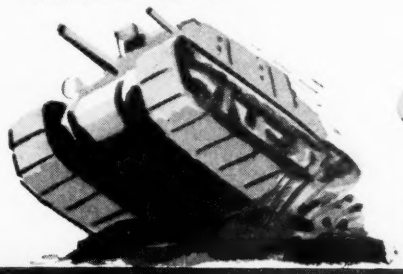

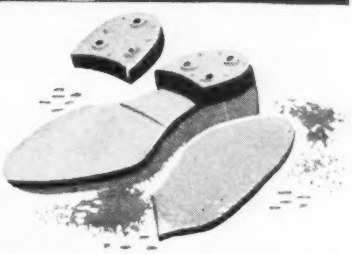

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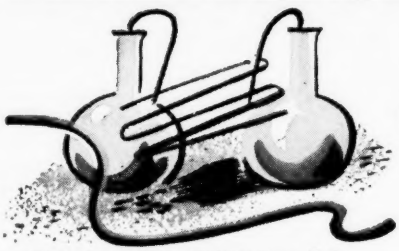

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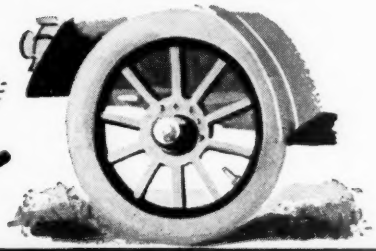

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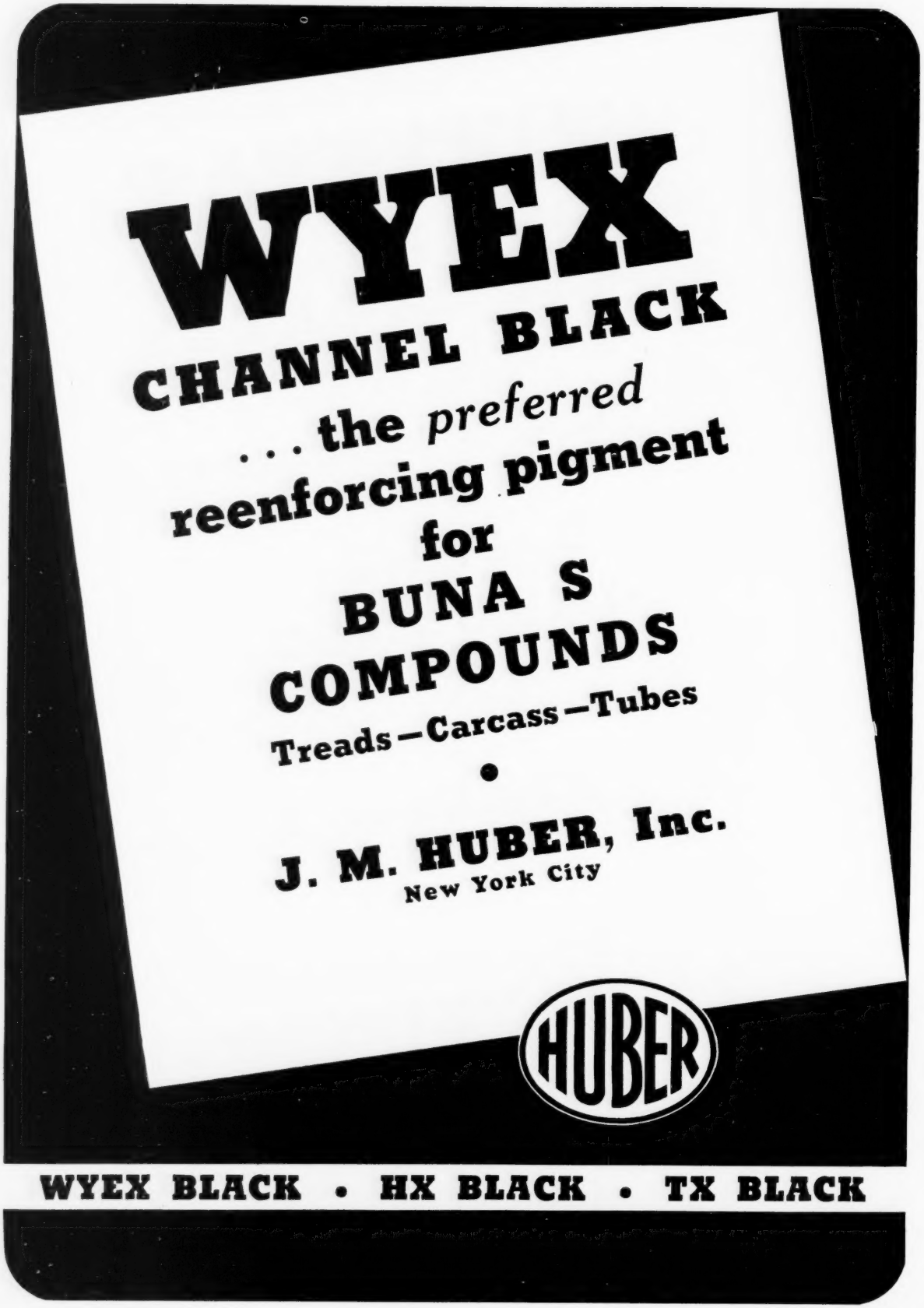
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Volume 106 **New York, July, 1942** **Number 4**

Replacements for Latex in Fiber Products Manufacture

R. T. Nazzaro[1]

DURING the past decade latex saturated papers and flexible fiber boards have found increasing prominence in the manufacture of all grades of shoes as well as artificial leather, novelties as ladies' dress belting, imitation patent leather, book covers, inexpensive pocketbooks, notebooks, etc. The bulk of treated papers, however, has been utilized by the shoe trade for innersoling, midsoling, reenforcements, quarter linings, sock linings, plumping, etc. Because of continued performance the use of treated papers has steadily increased, and today the business of saturating paper and of making fiber board is a distinctive and important industry. Indeed the increasing scarcity of leather as a result of the war effort has merely stressed the importance of treated papers in the manufacture of civilian shoes.

Use of Reclaim Dispersions and Synthetic Resin Emulsions

Recent restrictions on the use of rubber latex and reclaim dispersions of rubber have caused revolutionary changes in the field of paper sizing and saturation. In most instances the initial restrictions brought about an almost immediate utilization of reclaim rubber dispersions. More recently remarkable success has been attained in the production of saturated paper and fiber board by the sole use of synthetic resin emulsions. Fortunately this forward step was achieved with minor changes in plant production methods. It was found necessary, however, to modify the usual latex techniques.

Rubber latex with its tough, elastic, flexible and continuous film imparted ideal binding properties to the paper fiber. These properties were approached with reclaim dispersions after considerable difficulties in production. However by properly compounding reclaim dispersions with stabilizers, curing ingredients, and tough, flexible synthetic resin emulsions, a saturated sheet similar in physical characteristics to the latex sheet became a commercial possibility.

[1] Director, Rubber Laboratories, American Resinous Chemicals Corp., Peabody, Mass.

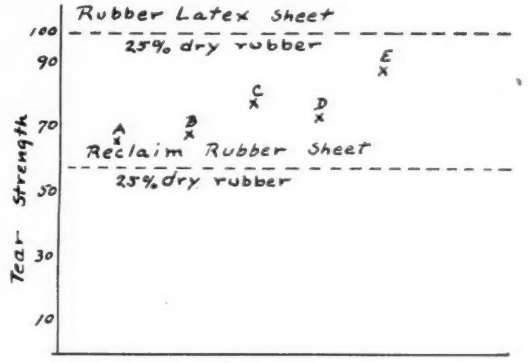

Fig. 1. Comparative Tear Strength

A—Reclaim Rubber + Slow Curing Ingredients
B —75% Curing Reclaim Rubber + 25% Alkyd 18
C —75% Curing Reclaim Rubber + 25% Vinyl Polymer Emulsion 58-8E
D —75% Curing Reclaim Rubber + 25% Acryl HPP35
E —All Vinyl Polymer 58-8E

Compounding Reclaim Dispersions With Resin Emulsions

Resins serve a two-fold purpose: (1) they extend the amount of reclaim rubber permissible for this purpose; (2) they improve aging characteristics and strength of treated papers. Solution of the problem involved preparation of higher molecular weight alkyd resins with a maximum of linear polymerization, non-oxidizable in order to have no adverse effect upon rubber, and compatible with the rubber hydrocarbon. In order to strengthen cohesiveness of the reclaim rubber film, it was necessary to formulate synthetic resin emulsions or dispersions which would have stabilizing action on the reclaim dispersion, give films of maximum water resistance, which would not clog pumping or other equipment in beater processes, and which would survive manipulation in sheet impregnation methods. A number of true elastomers compatible with the rubber film were found suitable. Experience indicates that vinyl polymers, acrylic ester condensation products, selected alkyds, and more recently certain types of maleics give superior results. See Figure 1.

The effect of increasing amounts of Alkyd 18 and Vinyl Polymer 58-8E are compared below in Figures 2 and 3 respectively.

Reclaimed dispersions of rubber are normally stabled to mechanical agitation, but are rather lacking in chemical stability. Rapid dilution of a reclaim dispersion usually

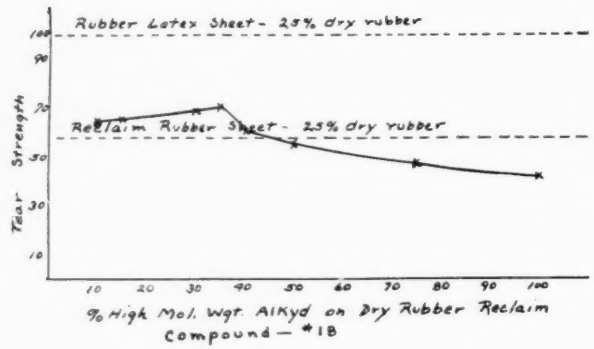

Fig. 2. Effect of Alkyd Resin in Reclaim Rubber Sheet

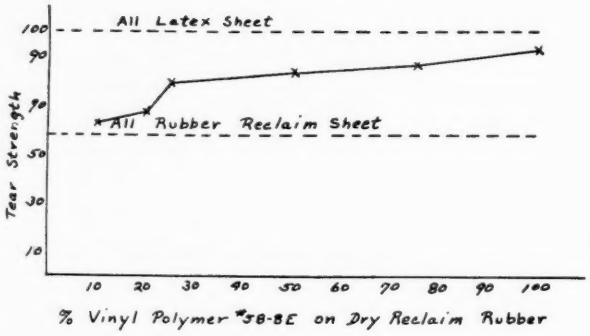

Fig. 3. Effect of Vinyl Polymer 58-8E

causes coagulation of the rubber phase upon brief storage. The addition of stable resin emulsions has improved the stability of a reclaim dispersion against rapid dilution down to 6% solids reclaim. Greater continuity of the resin-reclaim film has also been noted, resulting in better strength, more flexibility, and improved water resistance.

The tests listed below indicate that the aging qualities of the resin-reclaim paper sheet are superior to the all-latex rubber, especially when the reclaim had been previously compounded for slow vulcanization. See Table 1.

TABLE 1. ACCELERATED AGING RESULTS

	Number of Days in Oven at 160° F. before Failure
Rubber Latex Sheet	6
Curing Rubber Latex Sheet	7
Cured Rubber Latex Sheet	4
Reclaim Rubber Sheet	9
Curing Reclaim Rubber Sheet	12
Cured Reclaim Rubber Sheet	5
Curing Reclaim + Vinyl Polymer Resin Sheet	16

Use of Synthetic Resin Emulsions Alone

Recent interest has centered about the commercial utility of an all-resin impregnated paper because of the possibility of further restrictions on the use of reclaim rubber. For most practical purposes the alkyds have been too lacking in strength to be useful in themselves as paper impregnants. Thus far the chief utility of the short-oil alkyd has been to reduce the cost of the more expensive resins.

Certain cellulose derivatives have been considered satisfactory impregnating agents for inexpensive grades of sock lining. Stay and soling materials were better produced from one or more of the vinyl polymers and copolymers or from acrylic ester polymers. The acryls have the disadvantage of cost, but, on the other hand, offered better all-around properties, such as water resistance, good aging, and ease of handling. It has proved possible to extend vinyl and acryl polymers through the use of custom-made alkyds and thereby produce sheets approaching those prepared from latex in properties and low cost.

The vinyl polymer, properly plasticized and suitably stabilized, yielded paper products of unusual toughness which approached an all-rubber sheet in all qualities but that of water resistance. At first this latter factor was quite troublesome, but recently compounding emulsions have been originated to overcome the defect and are in practice commercially. By properly compounding alkyds, acrylics, and vinyls, it is possible to obtain a migration of the most water-resistant resin to the surfaces of the sheet. Thus it has been found that the vinyl can remain in the center of the sheet; the acryl goes to the outer surfaces.

Depending upon the plasticizers employed, the rate of deterioration of an all-resin sheet is extremely low and certainly much superior to the all-latex sheet. Deterioration, if it can be called such because the resin itself is unaffected, results as a loss of plasticizer either by adsorption by the paper fibers or by volatilization. For example, dibutyl phthalate in vinyl sheets gives good initial flexibility, but because of its high adsorption and relative volatility gives poor aging characteristics. Plasticizers such as dicarbitol phthalate are more suitable. However properly selected mixed plasticizers deposit films which excel the aging characteristics of the unvulcanized rubber paper sheets as determined by accelerated aging tests. This condition is readily determined when representative treated paper samples are exposed to ultra-violet light radiation.

Considerable work has been done on the production of flexible fiber board from combinations of pulp and resin emulsions in place of rubber latex or reclaim rubber. Successful extension of available reclaim can be carried out by additions of a short-oil alkyd or vinyl resin emulsion; the choice depends upon the ultimate fiber board desired. Any additive film extender causes a readjustment in the stability factor—a condition which must be carefully controlled in order to prevent premature coagulation in the early processing stages. Precipitation of the resin just prior to paper making must be complete and homogeneous in order to overcome irregularities in the formation of the board. The same conditions as in latex or reclaim extender-combination prevail in the all-resin fiber board with the advantage that resin emulsions are more readily controlled for pH and stability. Alum is generally employed for reduction in pH readings, although in certain cases of stabilization a more active polyvalent metallic salt has been found necessary for homogeneous precipitation and uniformity.

The process of yielding a waterproof beater sheet from resin emulsions differs slightly from the technique employed in the saturation of paper. Acrylic resins were also used to impart a more water-resistant surface. Additional water resistance was obtained by causing precipitation of the emulsifying agents to an insoluble form. It is necessary therefore that a combination of alum or some other polyvalent metallic ion be employed in the setting of the resin particle on the paper fiber. This parallels, of course, wax emulsion or rosin soap sizing.

Conclusion

(a) Successful low-cost sheets are being produced commercially by the use of reclaim dispersions extended 50% or more with suitable resins.

(*Continued on page 395*)

Chemical Reactions of Rubber—II[1]

R. L. Sibley[2]

AN ACID derivative of rubber not a cyclo rubber is the addition product with a halogen acid. For example, if hydrochloric acid gas is passed into a benzene solution of rubber at ordinary temperature, a compound results which can be easily separated by steam distillation and washing. From such a product the manufacture of transparent films and sheets has been developed (*69*).[3] The main claims for the commercial hydrochloride, marketed under the trade name of "Pliofilm", in connection with its use for wrapping and packing, are that it is strong, stretchable, tear-resistant, moistureproof, and not affected by oil or grease. It is readily heat-sealed by heating at 105-130° C. For photographic films it is stabilized by admixture with an anti-acid substance, such as pine oil.

Another type of a modified rubber hydrochloride composition is that obtained (*70*) by milling and molding the hydrochloride with up to 10% its weight of various metallic phosphates. Light-colored stiff products are obtained. Rubber hydrochloride in toluene solution has been reacted with a metallic sulphide or polysulphide to form a product that can be molded (*71*).

Rubber hydrochloride can be dehalogenated by heating with pyridine or piperidine, preferably in a solvent at 125-145° C. to produce a halogen-free product different in properties from the hydrochloride and also from rubber itself (*72*). Alternatively, the rubber hydrochloride dissolved in chloroform is mixed with zinc dust and mineral acid and heated. The halogen-free product is dried (*73*).

Concentrated nitric acid reacts slowly with crude rubber in the cold, but on warming or by the use of fuming nitric acid, the reaction becomes violent. A solution is finally obtained which on pouring into water forms a flocculent yellow precipitate (*74*), which closely approximated the formula $C_{10}H_{12}N_2O_6$. A product said to be suitable for impregnating, coating, and insulating purposes is formed by treating a carbon tetrachloride solution of rubber with concentrated HNO_3 (*75*). This product has the formula $(C_5H_7NO_2)x$ and slowly decomposes at room temperature. Rubber can be depolymerized by treatment with 36° Be. nitric acid (*76*).

Since the action of nitric and hydrochloric acids with rubber had both been described, it was thought interesting to try the effect of a mixture of these two acids, as aqua regia. No reference was found reporting such work. Accordingly, a 20% benzene solution of pale crepe rubber was treated with aqua regia at room temperature with rapid stirring until the mixture became too stiff to stir. The reacting mass was allowed to stand overnight and then extracted repeatedly with boiling water until the wash water reacted neutral to Congo red. The products were then dried overnight in an oven at 70° C. Using one part by weight on one part of pale crepe rubber, the product was dark brown and spongy with no elastic properties. This product was found to contain 7.4% chlorine and 2.8% nitrogen. A second sample reacted as described in the ratio of one part pale crepe rubber to 2.5 parts aqua regia formed a light-brown brittle product containing 9.9% chlorine and 6.8% nitrogen. A third cement of pale crepe rubber reacted in the ratio of one part rubber to five parts aqua regia also formed a hard light-brown brittle product containing 24.1% chlorine and 7.1% nitrogen. All three products formed were only very slightly soluble in 100 times their weight of benzene or acetone. None of these products possessed any thermoplastic properties, nor could they be plasticized by the use of equal parts by weight of any of the commonly used plasticizers. Furthermore the products will decompose on heating to about 70° C.

A true sulphonate of rubber is obtained by adding an ether solution of rubber to an ether solution of chlorsulphonic acid, while keeping the mixture cold. The sulphonation is continued with agitation for 24 hours at 20° C. (*77*). A water soluble sulphonic acid derivative is obtained by treating rubber with oleum or with chlorsulphonic acid (*78*). A balata or gutta percha substitute is obtained by treating rubber with p-toluene sulphonic acid (*79*). In another patent (*80*) the distillate obtained by heating rubber and having a boiling range up to 350° C. is treated simultaneously with butyl alcohol and 93% sulphuric acid with agitation at 40-45° C. After treating with lime to form a calcium sulphonate, filtering, and transposing with dilute sulphuric acid and neutralizing with sodium carbonate, a white solid of waxy nature is formed. The products are soluble in water, ethyl acetate, and acetone, and insoluble in benzol and chlorinated hydrocarbons.

Nitrogen peroxide, when passed through a benzene solution of rubber, forms a granular precipitate which after solution in acetone and precipitation by ether produces a buff-colored powder (*81*).

Nitrogen trioxide (N_2O_3) and nitrogen tetroxide (N_2O_4), both form addition products with rubber-yielding powders, one of which, "Nitrosite C", has been adapted to the quantitative determination of the rubber hydrocarbon in crude and vulcanized rubbers (*82*).

Certain nitroso compounds also form addition products with rubber, such as nitroso benzene (*83*) and the nitroso toluenes, and ethers of nitroso phenols (*84*). By mixing rubber with nitroso amines and heating at 80° C. for 30 minutes, tacky products are obtained (*85*). A similar tacky product is formed with nitroso β-naphthol (*86*).

Chromyl chloride forms addition products with the terpenes and forms a like compound with rubber (*87*). The product is a brown powder insoluble in most organic solvents and decomposed by water to form resinous products.

Rubber, as the hydrocarbon, has been reacted by the well-known Friedel-Crafts reaction with aromatic halogen derivatives, particularly benzyl chloride (*88*). By the method described, anhydrous aluminum chloride in carbon tetrachloride is poured quickly into a cooled carbon tetrachloride solution of rubber containing benzyl chloride. Hydrochloric acid is evolved and a gray-white spongy mass is formed which remains as a white amorphous product. The mixture is warmed on a water bath until no more acid is evolved; the solvent is removed, and the product washed with acetone and dried. The nature of the product varies, depending on the reaction conditions. The products are described as readily powdered, as having a density of about 1.10, and as being inert to most organic solvents. The products are but slightly thermoplastic. Since benzyl chloride itself polymerizes under the influence of aluminum chloride (*89*), and since rubber is cyclicized by the action of metallic chlorides (*90*), there is some doubt regarding the nature of the product described

[1] Paper presented before the Chicago Group, Division of Rubber Chemistry, A. C. S., May 1, 1942.
[2] Monsanto Chemical Co., Rubber Service Dept., Nitro, W. Va.
[3] For literature references see end of article.

by Kirchhof (91). In some unreported experiments in which benzyl chloride has been used in ratios between $^1/_{64}$ and two mols per mol of rubber (as C_5H_8) both with and without solvents, at temperatures from room temperature to 100° C. and with catalyst ratios from 1.8 to 22% by weight on the rubber and employing the anhydrous chlorides of aluminum, zinc, iron, and tin as catalysts, no single rubber derivative resulted. The products apparently were a mixture of four different products, namely, cyclicized rubber, benzyl chloride-rubber derivative, benzyl chloride polymer, and rubber hydrochloride. Increasing the benzyl chloride ratio naturally increases the proportion of the two last products. The low benzyl chloride products are rubbery; while those with higher proportions of benzyl chloride resemble leather. The materials are all slightly thermoplastic, but are not thermosetting. Solvents apparently favor the formation of the benzyl chloride polymer. The various products do not appear to possess any favorable properties. Benzyl chloride polymerized by itself yields a brittle product that can be plasticized, but the plasticized polymer does not improve a rubber compound, and although the polymer is insoluble in kerosene and benzol, yet the rubber stocks containing the polymer are still oil soluble. The rubber-benzyl chloride polymerized product can also be plasticized, but again the plasticized product does not yield a satisfactory vulcanized product as the modulus and tensile values are very low.

An interesting series of products recently has been described (92) as obtained from rubber by reaction with maleic anhydride. In the presence of small amounts of benzoyl peroxide, maleic anhydride reacts with rubber in solution by addition at the double bonds. The benzoyl peroxide is necessary for the reaction, but appears to act only as a catalyst. A plurality of products has been obtained containing from a few per cent. up to as much as 120% of maleic anhydride calculated on the rubber. The various products obtained differ considerably from rubber in physical properties, varying from tough, somewhat rubbery products through fibrous products to hard brittle products as the maleic anhydride content increases; at the same time the products become less readily soluble in rubber solvents and more soluble in solvents for maleic anhydride. The product further varies in properties with changes in the reaction conditions. The products as yet have not apparently become of commercial importance, although it is pointed out that they are of much technical interest because of the variety of products obtainable and the possibility of forming further derivatives through reaction with active groups present. Typical of such products is the resinous product obtained by treating rubber and a phenol at elevated temperatures followed by reaction with an aldehyde (93).

A rubber conversion product, which in a compounded stock is claimed to show increased resistance to abrasion, is obtained by treating a benzol solution of rubber with such materials as phthalyl chloride, phosgene in the presence of aluminum chloride, or titanium tetrachloride at room or higher temperatures (94).

Another conversion product, stated as capable of addition to crude rubber for improvement in its properties, results from the treatment of latex or a rubber dispersion with formaldehyde in the presence of acids under such temperature conditions that no isomerization occurs (95).

A non-elastic rubber derivative is obtained by cutting rubber into small pieces and allowing it to stand for 14 days in a closed container at 25° C. in contact with chlor methyl ether. A tough, spongy product is obtained after steam distilling and drying the product (96).

A hard plastic mass is stated to be obtained by swelling rubber with twice its weight of a solvent, such as tetrachlorethane, stirring for about one-half hour with stearic acid, after which aluminum chloride is added and the mixture refluxed for six hours at 140° C. The reaction product is cooled, poured into an ice-hydrochloric acid mixture, steam distilled to remove solvent, washed free from acid, and dried (97).

Azo dyes are stated as obtainable by reacting rubber di(hydroxy phenyl) formed by the reaction of rubber bromide and phenol, with a diazotized aromatic amine, for example sulphanilic acid (98). Sulfonation produces water soluble dyes (99).

A rubber derivative possessing antioxidant properties is stated to be obtained by heating rubber with an aryl amine or a salt of an amine. Thus rubber heated with aniline or aniline hydrochloride at 250-280° C. under 50-100 pounds' pressure for eight hours forms a brownish mass which after steam distillation is thermoplastic and can be used to bond rubber to steel (100).

Rubber is transformed into a benzol insoluble product by allowing a benzol rubber cement to stand at room temperature for 20 hours in contact with nickel carbonyl or lead tetra ethyl. A tough, black gelled rubber is formed (101).

Thioglycolic acid standing in contact with pale crepe rubber for 16 months at room temperature converts the rubber into a product soluble in normal caustic soda solution. Balata reacted in the same manner as did rubber, while gutta percha was not affected (102).

No great success has thus far been attained with three types of products of rubber with synthetic resins: namely, rubber condensed with the reagents used to make synthetic resins, with materials formed by the intimate admixture of synthetic resins and rubber or by sections of rubber and synthetic resins brought together to form laminated products (103). Several patents do disclose rubber or latex combinations with phenol-aldehyde resins (104).

Several such so-called rubber copolymers have been described. One such product is obtained by mixing deresinated rubber with coumarone or indene and heating the mixture for several hours at 130-160° C. Acrylic acid ester or a soluble phenolaldehyde condensate likewise yields thermoplastic products (105).

Another rubber copolymer results from mixing rubber with a softener and an emulsion of acrylic nitrile or ester of acrylic acid, and polymerizing (106). Rubber has also been copolymerized with a hydrocarbon of the butadiene series (107). In a more recent study rubber latex, either normal or concentrated, has been blended with an artificial latex or emulsion of polymerized synthetic resins including acrylic nitrile, methacrylic methyl ester and styrene. The mixed latices are then coagulated by the addition of acid, and the coagulum washed and dried. The coagulum is said to have a uniform texture, with all evidence pointing to the intimate dispersion of the resin particles among the rubber particles. The presence of the resins has a marked stiffening effect even when the resin content is low. There is also a marked decrease in breaking strength and an increase in permanent set. Although no evidence was presented, it is suggested that such mixtures should produce a compounded stock of improved solvent resistance and wearing properties (108). Rubber in a solvent or in latex form has been heated with monomeric styrene and a catalyst (109).

Interesting products have resulted from the heating together under polymerizing conditions of rubber latex with styrene. In this work an emulsion of an oxidizing catalyst and monomeric styrene in water was prepared and added to rubber latex stabilized by means of a suitable wetting agent. Sufficient water was employed in preparing the emulsion to reduce the latex from a 60% to a 40%

dry rubber content. After agitating at about 60° C. for approximately 48 hours, the emulsion was coagulated by the addition of alcohol, which also dissolved any unreacted styrene. The rubbery product was then washed and dried. The properties of the product obtained vary directly with the quantity of styrene combined. Reacting with 40% styrene and compounding the product with 10% zinc oxide, 20% whiting, 40% carbon black, 4% sulphur, 3% stearic acid, 2% pine tar, and 1% accelerator gave a stock curing to a hardness of 68 and having a tensile strength of 1,620 pounds per square inch at 325% elongation. Higher tensile strengths are obtainable with lower styrene additions.

Rubber has been found to react with aryl poly halides to produce a new type of product. The reaction is readily carried out by treating a solution of rubber in benzol or carbon bisulphide at the boiling point of the solvent in the presence of a catalyst such as aluminum chloride for a length of time and with the quantity of polyhalide required to produce the type of product desired. After the reaction is complete, the solvent is removed, and the product washed on a rubber washer and dried. The same product may be formed in the absence of solvent by adding the reactants to masticated rubber on the rubber mill and continuing the milling until the reaction was completed. The properties of the product formed vary directly with the quantity of reactants and time of treatment. Generally speaking, the higher the ratio of polyhalide employed the less rubber-like and the harder is the product formed. The products are thermoplastic and require sulphur and accelerator for their curing. The full possibilities of the softer products obtainable have not yet been fully determined, but the hard products possess interesting properties. Compounding 100 parts of a product, the weight increase of which on the rubber reacted was 40%, with 10% zinc oxide, 60% whiting, 10% titanium dioxide, 3% sulphur, and 1.25% accelerator, and curing for 30 minutes at 141° C. a white product of 98 hardness on the hard rubber gage was obtained. Adding 1% of rubber colors to the mix, colored hard rubber is readily obtainable. The product was found to possess a higher impact strength than hard rubber. The same reaction also has been found to take place with many synthetic rubbers.

A cement of the compounded reaction product can be used for building up plies of cellulosic material, such as wood, paper, and cotton cloth, or the cement can be thickened by the addition of sawdust or wood flour and briquettes cured from it.

An interesting property of all these products is their capacity to react further with aromatic hydrocarbons containing alkyl side chain substituents. With one such hydrocarbon, as much as 240% weight increase on the rubber may be caused. Naturally with the rubber comprising only about 40% of the weight of the product, and that rubber having been modified by chemical reaction, the elastic properties of the rubber have been impaired, but it has been also greatly improved over rubber in other respects, such as resistance to ozone and to various solvents. The product may be used to replace up to 20% by weight of the synthetics in an oil-resisting stock with no impairment in physical properties, but with improved handling conditions. In quantities from 20% up to 50% by weight of the synthetics, there results a drop in tensile strength and decreased modulus, but the solvent-resistant properties are not affected although resistance to aromatic solvents is not improved.

A product of theoretical interest, but apparently of little practical or commercial importance is the so-called inorganic rubber obtained by reacting phosphorous pentachloride with ammonium chloride in a solvent. The mixture is refluxed for 20 hours at 140-145° C. After removal of the solvent, the phosphonitrilic chloride is distilled, and the distillate polymerized by heating at 250° C. A brown rubbery product results which, however, is unstable and decomposes in the presence of moisture. Several variations in the procedure (110) failed to improve the product. The only method found for curing the polymer consisted in mixing it with 50% by weight of zinc oxide and heating for 30 minutes at 141° C. in a mold. The product cured to a hardness of 80, but possessed very poor tear resistance.

The foregoing references are not by any means intended to comprise a complete exposition of all the patents and recorded literature on the subject of rubber derivatives. In some of the more active fields, and particularly in those resulting in commercial exploitation, there exist many articles and patents. For example, there have been issued to one assignee a total of 24 United States patents related to cyclised rubber, each one of which has not been discussed in this summary. It is, however, thought that at least one reference has been mentioned of every different type of reaction thus far reported to which rubber or rubber hydrocarbon has been subjected.

The nature of the products obtained have varied widely in physical characteristics and in chemical reactivity. The products described have varied from tacky gums to hard, resin-like plastics. Many products have resembled leather in nature and sometimes in appearance. The more profoundly the rubber hydrocarbon molecule has been altered, the less elastic and the more resin-like has been the resulting product.

It has been shown that rubber is a chemically active material and reacts like any typical olefin hydrocarbon. Under proper reacting conditions, rubber forms addition products with many substances such as sulphur, oxygen, ozone, hydrogen, the halogens, the hydrohalides, dithiocyanogen, dithioglycolic acid, and other materials. Rubber further forms substitution products with many other substances. In fact, the study of rubber as a chemical compound has only been seriously investigated in recent years. Further study may well extend its applications into hitherto unsuspected fields of usefulness and value.

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Hevea Rubber Culture in Latin America[1]

Problems and Procedures—II . . .

R. D. Rands[2]

OPERATION OF THE COOPERATIVE CLONE-IMPROVEMENT PROGRAM—Activities of the previously described stations[3] are closely coordinated with those in behalf of rubber of all the cooperating Latin American republics. The joint endeavor of governmental agricultural agencies and adequately financed rubber companies of all countries on a single united program is required to secure the best possible planting material and to guarantee most rapid advancement of the industry in all other respects. In no important item are the Latin American nations so heterogeneous as the rubber-producing countries of the Far East; yet the latter finally came to realize the mutual advantages of united action, free exchange of planting material and information.

The equitable sharing of all improved planting material among the American nations is based on the just reason that all countries should, and eventually will no doubt, play an important role in its production. The program, which is already well advanced, is illustrated in Figure 4. This is merely a diagrammatic attempt to show the relations between the widely separated, but mutually interdependent phases of this cooperative plant-improvement program.

In this diagram the U. S. Department of Agriculture, together with its principal cooperative field station in Costa Rica, is represented as a convenient liaison agency between the various countries in the assembling and testing of plant collections and the development of superior clones. This is designed to foster closer relations between the countries themselves and provide safe interchange of planting material without spreading the South American leaf blight to new areas.

Here the countries are grouped according to the occurrence of leaf blight which is the most important problem to be solved in developing better clones and a permanent self-sustaining industry. Most of the countries having districts now afflicted with this plague, i.e., those in Column A of Figure 4, are those possessing resources

[1] Grateful acknowledgment is made to Karl D. Butler, T. J. Grant, M. H. Langford, and H. G. Sorensen, agents of the United States Department of Agriculture in Latin America, for supplying experimental data on which the clone recommendations in this paper are based.

[2] Senior pathologist, Special Rubber Investigations, Bureau of Plant Industry, U. S. Department of Agriculture.

[3] See INDIA RUBBER WORLD, June, 1942, pp. 239-243.

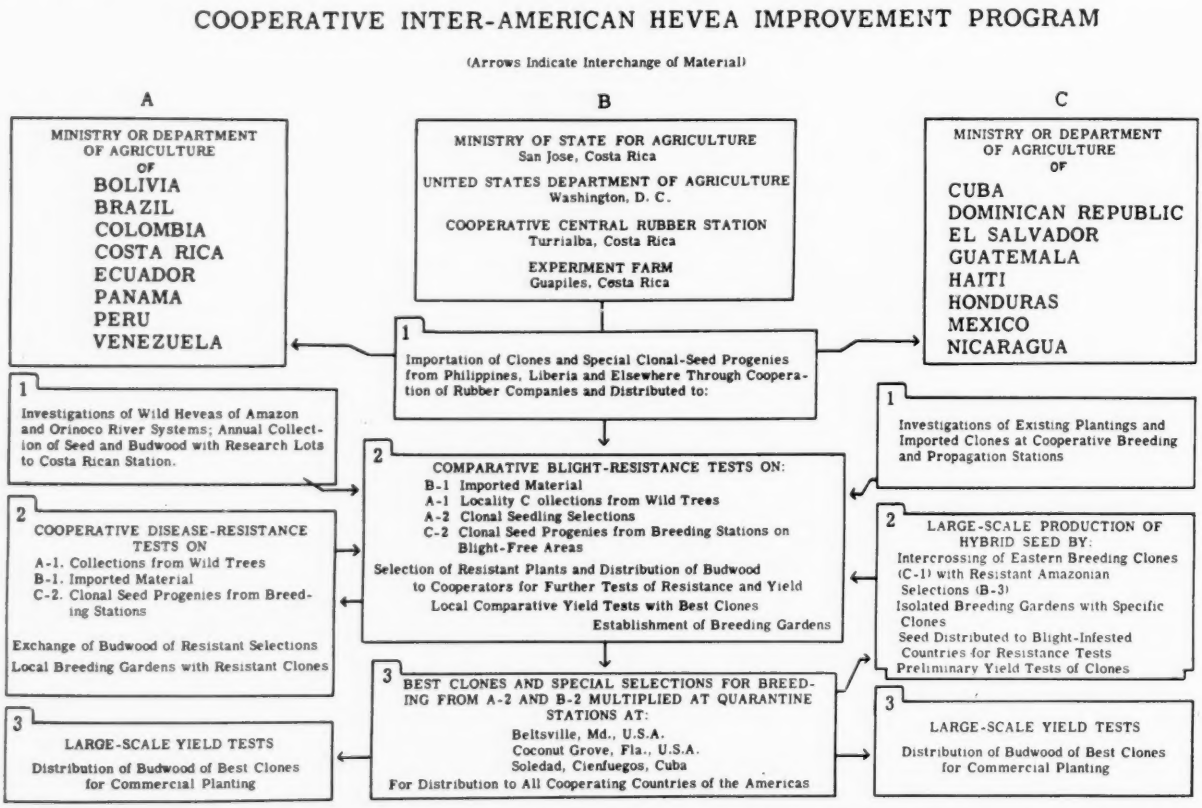
COOPERATIVE INTER-AMERICAN HEVEA IMPROVEMENT PROGRAM
(Arrows Indicate Interchange of Material)
A
MINISTRY OR DEPARTMENT OF AGRICULTURE OF
BOLIVIA
BRAZIL
COLOMBIA
COSTA RICA
ECUADOR
PANAMA
PERU
VENEZUELA
B
MINISTRY OF STATE FOR AGRICULTURE
San Jose, Costa Rica
UNITED STATES DEPARTMENT OF AGRICULTURE
Washington, D. C.
COOPERATIVE CENTRAL RUBBER STATION
Turrialba, Costa Rica
EXPERIMENT FARM
Guapiles, Costa Rica
C
MINISTRY OR DEPARTMENT OF AGRICULTURE OF
CUBA
DOMINICAN REPUBLIC
EL SALVADOR
GUATEMALA
HAITI
HONDURAS
MEXICO
NICARAGUA
1
Importation of Clones and Special Clonal-Seed Progenies from Philippines, Liberia and Elsewhere Through Cooperation of Rubber Companies and Distributed to:
1
Investigations of Wild Heveas of Amazon and Orinoco River Systems; Annual Collection of Seed and Budwood with Research Lots to Costa Rican Station.
1
Investigations of Existing Plantings and Imported Clones at Cooperative Breeding and Propagation Stations
2
COMPARATIVE BLIGHT-RESISTANCE TESTS ON:
B-1 Imported Material
A-1 Locality C ollections from Wild Trees
A-2 Clonal Seedling Selections
C-2 Clonal Seed Progenies from Breeding Stations on Blight-Free Areas
Selection of Resistant Plants and Distribution of Budwood to Cooperators for Further Tests of Resistance and Yield
Local Comparative Yield Tests with Best Clones
Establishment of Breeding Gardens
2
COOPERATIVE DISEASE-RESISTANCE TESTS ON
A-1. Collections from Wild Trees
B-1. Imported Material
C-2. Clonal Seed Progenies from Breeding Stations
Exchange of Budwood of Resistant Selections
Local Breeding Gardens with Resistant Clones
2
LARGE-SCALE PRODUCTION OF HYBRID SEED BY:
Intercrossing of Eastern Breeding Clones (C-1) with Resistant Amazonian Selections (B-3)
Isolated Breeding Gardens with Specific Clones
Seed Distributed to Blight-Infested Countries for Resistance Tests
Preliminary Yield Tests of Clones
3
BEST CLONES AND SPECIAL SELECTIONS FOR BREEDING FROM A-2 AND B-2 MULTIPLIED AT QUARANTINE STATIONS AT:
Beltsville, Md., U.S.A.
Coconut Grove, Fla., U.S.A.
Soledad, Cienfuegos, Cuba
For Distribution to All Cooperating Countries of the Americas
3
LARGE-SCALE YIELD TESTS
Distribution of Budwood of Best Clones for Commercial Planting
3
LARGE-SCALE YIELD TESTS
Distribution of Budwood of Best Clones for Commercial Planting

Fig. 4. Diagram Showing Mutual Interdependence of All Cooperating Countries in the Development of Blight-Resistant and Superior Yielding Rubber Clones. Highly Resistant Selections from Wild Trees from Countries in the Left Column (A) Can Be Crossed with the Highest Yielding, But Susceptible Eastern Breeding Clones in the Blight-Free Countries at the Right (C). Hybrid Seed Is Then Returned to (A) for Resistance Tests from Which Selections Combining Resistance with Superior Yield Are Available for Safe Planting in All Countries

Photographed December, 1941, by M. H. Langford

Fig. 5. A Semi-Resistant (Class 6) Philippine Clonal Seedling Surrounded by Defoliated or Dying Susceptible Seedlings of the Same Age Growing in the Leaf-Blight Testing Nurseries at Turrialba, Costa Rica

of wild trees which contain valuable qualities such as resistance which may be combined with the high yield of the Eastern clones in order to develop the highest type of cultivated variety. Some of these countries have important blight-free areas suitable for rubber and which, because of high mountain barriers, may remain free for many years. Obviously, their hazard of invasion is greater, however, than the more distant countries completely free from the disease.

The blight-free countries (Column C of Figure 4) have the opportunity of utilizing the highly susceptible, but best breeding clones of the East for developing superior new clones with resistance to leaf blight to safeguard their plantings against damage from possible future invasion by this disease.

In order to do this they need to use the best and most resistant selections from the Amazon countries and subsequently have the seedling progenies from their breeding gardens tested for resistance in disease-infested areas. Thus the two groups of countries are mutually interdependent for most rapid progress in advancement of their rubber-producing industries.

Tests of Imported Clonal Seed. The first project outlined in Figure 4 is that in the first square of the middle Column B, inaugurated by this Department, and offers the prospect of securing improved clones from imported clonal seed progenies by selection following blight-resistance tests. The feasibility of discovering superior resistant clones by this procedure had already been demonstrated by several years of trials by the Goodyear Tire & Rubber Co. on its Central American plantations. Its initial phase, the resistance testing, is naturally limited to the blight-infested countries, although all others should participate in the yield testing of the resistant selections. Through cooperation of the Goodyear Tire & Rubber Co. 96,000 clonal seeds from its Philippine plantation were imported and planted in November, 1940, at the new station at Turrialba, Costa Rica. A second consignment, amounting to 204,000 seed, was obtained in February, 1941, and planted at Belém, Brazil, in cooperation with the Instituto Agronomico do Norte.

In September, 1941, through similar cooperation of the Firestone Tire & Rubber Co., more than two million clonal seeds were obtained from Liberia and divided for testing in the respective nurseries at Belém and Turrialba. The presence of large mono-clonal blocks of superior Eastern clones on the Firestone Liberian estates enabled collection of seed from abutting rows of trees where natural cross-pollination between clones would predominate. Hybrid seed progenies representing fourteen specific clonal combinations and a large supply of seed from mixed plantings of desirable clones were represented in this first shipment. Those combinations showing the highest percentage of resistant seedlings, along with vigor and other desirable qualities, will be emphasized in seed shipments of succeeding years.

In rating seedlings on resistance or susceptibility to leaf blight, ten classes have been described by M. H. Langford, who is in charge of this work at the Turrialba, Costa Rica, station. Class 1 represents complete immunity, with no noticeable flecks of the disease on the leaves, whereas Class 10 stands for repeated and complete defoliation eventually resulting in death of the plant. Seedlings or clones falling in Classes 1 to 6 are selected for further tests although Class 6 plants are considered marginal for commercial safety in areas favoring the disease. Leaves of Class 6 plants show marked spotting, are somewhat dwarfed, deformed, or ragged, and a small percentage may fall off. A Class 6 seedling surrounded by more susceptible plants of the same age is shown in Figure 5. This is the situation in the nursery under conditions favoring rapid spread and development of the disease. While experience may indicate certain localities where environmental conditions so hinder the disease as to permit satisfactory growth of Class 6, or more susceptible plants, it is advisable in the present state of knowledge to set Class 5 as the commercial limit.

From the clonal seedling nurseries planted in late 1940 and early 1941, already more than a dozen new clones have been established from vigorous seedlings with blight ratings of Class 5 or better. More than double this number of selections is anticipated from the larger Liberian seed nurseries now under test at Turrialba and Belém.

When it is realized that each of these clonal seedling selections has a 40 to 50% chance of yielding rubber at the same rate as its high-yielding parents, the intrinsic value of these new clones is appreciated. Occasional ones may, of course, greatly exceed the yield of the parents. If they are spaced closely in a mixed planting to permit later selective thinning based on yield during the first years of tapping, they should give satisfactory commercial production of rubber.

It is hoped that many more new clones may be developed through continuance of the annual importations and testing of clonal seed progenies. Thus far none of the new clones has proved so highly resistant to leaf blight as the Ford clones, many of which are rated in resistance Classes 2 and 3. While more resistant selections than Class 4 may be found in the Eastern material, the situation emphasizes the importance of immediate planting of breeding gardens as provided in the No. 2 squares of Figure 4.

Breeding Program. The problem of breeding superior new clones, combining high yield with high leaf blight resistance, is naturally simplified by the availability of the Eastern breeding clones even though they themselves happen to be very susceptible to the disease. The problem is further simplified by the fact that certain of these clones (listed presently in the discussion of breeding gardens) transmit some resistance even to illegitimate seedling progenies.

The direction of arrows on the diagram indicates the annual flow of hybrid seed (when the gardens attain production) from the blight-free to blight-infested countries for resistant tests; and conversely the later return of selections as recompense to the seed-producing countries in order that all may plant safe material and share in the successive improvement of the crop. Emphasis is placed on the wide distribution of breeding gardens in the uninfested countries to avoid serious interruption of the program from accidental disease invasion and ruination of susceptible breeding trees in some of them. The provision of quarantine stations in B-3 of the diagram should enable safe transfer of budwood from the infested to uninfested countries.

Emphasis is here placed upon the great importance of utilizing the proved Eastern breeding clones for most

rapid progress in obtaining superior planting material for the Americas. These clones transmit a concentration of factors for yield to duplicate which would probably require the growing, test-tapping, and selection from millions of seedling trees such as the vast plantation areas where they were discovered in the East. They are the product of some 30 years of research, but have only been utilized to a relatively small extent in the Eastern program for gradual replacement of old seedling rubber. Not all high-yielding cones, however, transmit this yielding quality to a large proportion of their seedling offspring. Therefore the few that have been proved to do so, through tapping results on their seed progenies from selfed or cross-pollinations, are especially valuable because of the many years required for such proof.

Crossing of these Eastern breeding clones with the highest yielding and most resistant selections of *Hevea brasiliensis* and the important other species from the Amazon countries will save much time in securing new clones which combine resistance with superior yield compared with attempts to select for high yield among the resistant material alone. Not enough seedlings will or rather should be planted in the infested countries from which to select many very high-yielding clones. The rubber industry has advanced beyond the stage of planting unselected seedlings. Of course several clones of average or superior yield may be discovered among the comparatively limited areas of resistant seedlings already planted by Ford and other companies, but the odds are against the finding of many very superior clones if the history of Eastern selection work may be taken as a guide. Therefore clones possessing very high leaf-blight resistance with moderate yield will necessarily be used for crossing with the Eastern material to increase yield and retain the resistance.

A breeding program may well follow the old and proved procedure with other plants of extremely variable or heterozygous nature. The resistant clone is crossed with the high-yielding susceptible one and resistant selections among the hybrids are then back-crossed to the susceptible parent in order further to increase yield, but if possible to retain the resistance. At each stage some of the highest yielding and most resistant selections will be of direct commercial value. The latter should also be planted in separate breeding gardens for free intercrossing. With *Hevea* even the first generation hybrids may be intercrossed without loss of vigor. Recombination and segregation of factors for yield and resistance will result in an intensification of both qualities in certain of the seedlings which may be discovered by test and represent a further step in clonal improvement. These particular breeding gardens can, of course, be located in all countries regardless of blight presence because they will be composed of resistant clones. Then, if the breeding qualities of the clones, especially the transmission of superior yield along with resistance, are sufficiently known, the clonal seed from such gardens might be used for direct commercial planting (without budding), such as already is practiced to some extent in the East.

Any plan for the breeding of *Hevea* is necessarily a projection for the future. Appreciable seed production only begins in the fifth or sixth year. Therefore the planting of breeding gardens must not be delayed.

Clones Recommended for Breeding Gardens. Two groups of clones are recommended for inclusion in mixed plantings to provide for optimum natural cross-pollination between susceptible and resistant components. Within each group the individual clones are segregated into lots of four each for pairing with a similar number from the other main group as follows:

Group 1. Far Eastern Breeding Clones (susceptible to leaf blight)

a	*b*	*c*
GA-183	GA-163	GA-337
GA-256	GA-272	GV-31
GA-352	GA-273	GV-37
GV-21	GA-308	GV-55

Group 2. Ford Brazilian Clones (highly resistant to leaf blight)

a	*b*	*c*
B-54	F-170	F-1702
B-74	F-211	F-1710
B-79	F-315	F-1717
B-3339	F-409	F-1721

The sub-grouping of the clones is partly arbitrary, but some classification is desirable unless all clones of both groups are to be indiscriminately mixed in a single planting. The latter procedure is undesirable for subsequent identification of the parents giving the most resistant hybrids found in the seed progenies without resorting to extensive hand pollinations. On the other hand, too little is known about the yield of the Brazilian clones to warrant duo-clone plantings. Therefore a compromise between the two extremes is tentatively suggested whereby in each breeding garden four clones of Group 1 are mixed with four from Group 2. This number should be sufficient to compensate for variations in time of flowering among the individual clones as well as possible uncongeniality between specific ones and thus secure a maximum of natural crossing. It would also permit thinning out the two to three lowest yielding or otherwise unsuitable Brazilian clones, leaving only the best for further cross-pollinations.

A further reason for sub-groupings is to take advantage of certain known characteristics which each sub-group or most of its members have in common. For example, the clones in Group 1a are known to transmit to their illegitimate offspring some resistance to leaf blight, according to communications from W. N. Bangham, director of plantation research for the Goodyear company, and recent field comparisons by M. H. Langford, pathologist of the Bureau of Plant Industry. GV-21 is reported to be less susceptible (rated in Class 8) than the remainder of the entire group (Classes 9-10). For their transmission of yielding and desirable qualities, GA-163, GA-308, GV-21, GV-31, and GV-37 are widely recommended as breeding clones throughout the Eastern rubber-producing countries.

The Ford Brazilian clones are grouped in part on the basis of geographic origin; Group 2a clones are from the lower river area centering at Belém; Group 2c are high-yielding selections from the Acre Federal Territory; and Group 2b are choice Fordlandia selections from diverse original sources (according to unpublished data kindly furnished by Messrs. Deckard and Zilles, of the Companhia Ford Industrial do Brasil). The composition of these groups of Ford clones is expected to change greatly in succeeding years with increased knowledge about these particular clones and the many others from which they were chosen.

In order to compare the value of hybrid-seedling progenies obtained from natural crossings between sub-groups of Group 1 and those under Group 2, a total of nine isolated seed gardens is required for all possible sub-group combinations as follows:

(1) Group 1a X Group 2a	(4) Group 1b X Group 2a	(7) Group 1c X Group 2a
(2) Group 1a X Group 2b	(5) Group 1b X Group 2b	(8) Group 1c X Group 2b
(3) Group 1a X Group 2c	(6) Group 1b X Group 2c	(9) Group 1c X Group 2c

It is unnecessary that all nine gardens be located on the same plantation, in the same district, or even in the same country although it would be desirable to have most of them in each of the blight-free countries. If less than the full number can be planted, there is little choice as to which combinations should have preference. From the above discussion of sub-groupings, the combination 1a X 2b might appear most promising, but practically nothing

is known about the inheritance of resistance to leaf blight. However the differences between clones in degree of resistance indicates that it is determined by multiple factors, such as is true for yield; therefore any factors for resistance contributed by Group 1 clones might be needed if insufficient resistance is transmitted to the hybrids by the resistant Group 2 parents. However the best parental combinations must also transmit good "secondary" qualities such as vigor of growth, good bark characteristics, resistance to wind-breakage and to brown bast. Therefore all the sub-group combinations should be tried. Furthermore for the next step in the clone-improvement program it will be desirable to utilize outstanding selections from many of these first sub-group combinations in order to introduce as many divergent and valuable lines of inheritance as possible into the third-generation clones to be obtained by intercrossing among the selections themselves or back-crossing to the high-yielding parents.

A second type of breeding garden should be planted in blight-free countries as soon as proved clones, established from moderately resistant Philippine and Liberian clonal seedling selections, are available. As mentioned earlier in this paper, few, if any, of these selections are highly resistant to leaf blight. Therefore free inter-crossing among themselves in isolated seed gardens should bring about segregation and recombination of factors with increase in both resistance and yield in at least some of the hybrids. It is uncertain, however, whether the increased resistance would approach that of the most resistant Ford selections.

Breeding gardens should be isolated from other rubber plantings to prevent introduction of outside pollen. The pollen of *Hevea* is sticky and is reported to be carried only by insects of which a species of bee is most important in the native habitat of the tree. Ordinarily no great isolation is required to keep out most of the stray pollen. A pollution of 10 to 15% derived from pollen of unwanted clones is of no great importance considering that the first use of the breeding-garden seed is for blight-resistance tests. Every resistant and otherwise desirable seedling from these seed progenies will be established as a new clone and tested for yield even if the male parent cannot be traced.

Breeding gardens may be screened by leaving a surrounding strip of forest or jungle a few hundred meters wide. Such gardens in the early years are liable to serious injury from depredations of wild animals and also are likely to be neglected. It would be better to place them in areas of other crops such as coffee, coconuts, or cacao should any of these be grown on the same plantation.

Where the above is impossible, or where rubber is the main crop, the scheme illustrated in Figure 6 suggested by d'Angremond (17)[4] is recommended. On a rectangular area of, say 16 hectares the chosen mother clones are put in a mixed planting, while later seed are harvested only from the inner four hectares enclosed by the heavy line. This inner area, therefore, is screened by a "pollen barrier" of the same clones 100 meters wide. The trees in the barrier are planted at the usual commercial spacing, and those of the same clones in the "isolated" area given a wide spacing for maximum seed production.

All isolated breeding gardens to be established in the early years of this cooperative program might well be planted at the usual commercial spacing to permit selective thinning of poorly developed individuals and poor breeding clones as determined by study of specific combinations through artificial pollinations. Thinning will also equalize or reduce too severe crown competition. On such questions as adaptation to climate and soils, little is known about the behavior throughout Latin America of any of the recommended clones in the two groups listed above. Therefore as breeding gardens may well constitute a part of the commercial rubber area of a plantation and be tapped as the remaining parts, no commercial sacrifice from very wide spacing should be taken for the sake of the extra hybrid seed for use in this particular clone-improvement program.

A semi-hedge type of planting in which the rows are about 6.4 meters (21 feet) apart and the individual trees in the row are spaced about 2.3 meters (7.5 feet) apart is recommended. This gives an initial density of about 680 trees per hectare (or 273 trees per acre). These include ample representation of resistant clones to continue the planting as a commercial area in the unfortunate event of leaf blight invasion and ruination of the susceptible clones. Approximately equal numbers of trees of susceptible and resistant clones should be alternated in each row according to the sub-group pairings listed above.

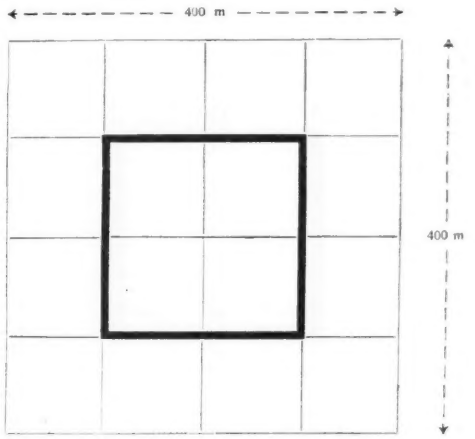

Fig. 6. Scheme for Establishing an "Isolated" Breeding Garden within a Commercial Rubber Planting. The Same Clones Used in the Central Area Are Also Planted in the Surrounding "Pollen Barrier"

Thus, for example, in the garden in which sub-groups 1a and 2a are to be planted for natural crossings the successive trees along the row would be GA-183, B-54, GA-256, B-74, GA-352, B-79, GV-21, B-3339, and so on, repeating until the end of the row. Of course a well-planned systematic shuffling of the clones whereby each one would occur a given number of times adjacent to every clone of the paired group might be devised, but this would require an accurate map of the garden to preserve the identity of every tree. It is essential that all trees of every clone be identified in the garden, and a simple repeated alternation will facilitate this and probably provide for ample cross-pollination of all clones.

Clones Recommended for Commercial Planting in 1942 and 1943

Brandes (1)[5] and Polhamus (18) have described the successive importations during 1940 and 1941 of Eastern clones from the Goodyear Philippine Estate. The last shipment arrived safely barely a month before the outbreak of war in the Pacific. These shipments contained two categories of material: (1) large quantities of budded stumps of about a dozen high-yielding clones which have shown some resistance to leaf blight; and (2) a small quantity of budded stumps of each of 120 Eastern clones which are very susceptible to leaf blight, but possess other

[4] The numbers in parentheses refer to "Literature Cited", which will appear at the end of each installment.
[5] See India Rubber World, June, 1942, p. 243.

desirable qualities of value at least in the breeding program as described above.

In Blight-Free Countries. The Goodyear Eastern clones of the first category above constitute one of the three groups of clones which may be recommended for mixed plantings *in all blight-free countries*, i.e., from Nicaragua to Mexico, and including the Haitian and Dominican Republics. The three groups follow:

Group 1: Goodyear Eastern proved clones, such as GA-1279, GA-1347, GA-1493, GA-2075, GX-26.

Group 2: Clones established in Latin America from blight-resistant clonal seedlings, such as Goodyear Speedway (GS Series), I.A.N. Series (Instituto Agronomico do Norte), and Tu. Series (Turrialba, Costa Rica, Station). (Obtained under the cooperative clonal seed-testing project as shown in Figure 4.)

Group 3: Ford Brazilian clones of the Belterra and Fordlandia Series, such as B-54, B-3339, F-211, F-315, F-409, F-1444, F-1620.

Group 1, alone, contains clones of proved individual-yielding capacity which range between 1,100 and 1,600 kilograms per hectare per year at maturity according to test records of the Goodyear Rubber Plantations Co. Group 2, after selective thinning, should also attain this yield level, judging from the known high yields of the mother clones from which they are seedling selections. Individually, however, they are not proved clones on the basis of test tapping of the buddings and, as explained in the discussion of the breeding program, there is a chance that 30 to 40% of these new clones may be inferior to their parents.

Group 3 clones, individually, are in the same unproved category as Group 2, with the odds in favor of a higher percentage of them proving to be inferior in yield because of their origin as first-generation selections. This is explained by the fact that among unselected jungle or seedling plantation trees only one parent would usually be superior; whereas in Groups 1 and 2 both parents were high-yielding clones. Therefore a greater concentration of factors for yield would be inherited by the clones in Groups 1 and 2 than by those of Group 3. Nevertheless some of the Ford clones should prove superior-yielding, and the very high leaf-blight resistance of all makes them of inestimable commercial value as insurance against this disease.

A total of more than 70 Ford clones, selected mainly on outstanding yield, blight resistance, and other superior qualities of the mother trees, is now under test at the Ford plantations, as well as at Belém and Turrialba. The seven numbers listed in Group 3, above, happen to be outstanding at present, but many others will be distributed during the next few years.

In view of the inadequate knowledge of the individual clones in Groups 2 and 3 and the insufficient resistance of Group 1 for use alone, mixed plantings containing representatives from all three groups appear advisable. Such will serve to divide the commercial risks and assure satisfactory yields even should leaf blight subsequently invade the plantings. In order to achieve this, it is recommended that an initial density of about 680 trees per hectare (or 273 per acre) be planted, of which about 227 trees per hectare (or 91 per acre) would come from each of the three groups of clones.

A semi-hedge type of planting system whereby the rows are about 6.4 meters (or 21 feet) apart and the individual trees are spaced about 2.3 meters (7.5 feet) apart within the row is recommended. This particular density and system of planting are given only as examples believed to be suitable for the available planting material. A slightly different density and spacing might prove equally as good. However it may be emphasized that the trend of experimental results during the last five to ten years in the Far East favors close initial spacing of the trees in the so-called "hedge" type of planting. The latter has obvious advantages for Latin America, such as cheaper land clearing, planting on contour, and tapping of the trees. Selective thinning is facilitated by only having to consider gaps along the row, and more trees per hectare with correspondingly higher yields can be maintained at maturity. The hedge type of planting is also most suitable where planting of other crops between the hedges or rows is planned.

A systematic mixing in every row of the clones from the three groups is very important from the standpoint of thinning and other influencing factors.

A mixed planting of the above approximate density and composition should give good yields from the beginning of tapping (fourth year in the field) and after removal of abnormal or deformed trees, may be gradually thinned out on the basis of yield to about 250 trees per hectare at maturity. An initially dense mixed planting, therefore, ideally allows for weeding out the lower yielding or otherwise inferior clones, assures the best individual tree adaptation to local soil variations, and at the same time a satisfactory commercial yield.

A further advantage of a mixed planting with clones of diverse genetic origin will be its probable stabilizing influence on the leaf-blight fungus if and when the planting is invaded and the less resistant clones attacked by this disease. Under such conditions, with no two adjacent trees exactly alike, the fungus is less likely to adapt itself by developing specialized strains which would be able to damage seriously the initially resistant clones. A "commercially resistant" monoclonal planting or a mixed one with closely related clones would be more favorable for such possible specialization of the fungus. Although such has not been demonstrated for the leaf-blight fungus, extensive evidence on similar diseases of other crops leaves little doubt that it could occur in this disease of *Hevea*. Therefore the above suggested clone mixture represents good insurance for the future.

In Blight-Infested Countries. For all countries in which leaf blight now occurs, i. e., from Costa Rica southward, mixed plantings of clone Groups 2 and 3 only are advised. It is true that Group 1 and other even more susceptible clones might be used with safety in certain areas having climatic conditions less favorable for leaf blight. Prolonged weather observations, however, would be necessary for selecting such areas, but preferably the establishment of small test plantings with clones of questionable resistance should give more conclusive results. For the latter purpose clones of Group 1 are being distributed by this Department to all leaf-blight infested areas.

Availability of Planting Material of Commercial Clones

In Leaf-Blight Infested Areas. Because of the brief period of operation of the cooperative clonal testing and improvement program (Figure 4) recommended clones in Groups 2 and 3, above, are as yet available for distribution only within leaf-blight infested areas. Large supplies of budwood are being built up in Brazil, Costa Rica, Panama, and other infested countries or districts which recently have exchanged direct shipments. The latter are permitted only through official intergovernmental channels and provide for most careful disinfection and packing of the budwood to prevent spread of insects and diseases from one country to another. These measures do not guarantee absolute protection from spreading the leaf-blight fungus, but in the present emergency this risk can be taken since shipments are made only between districts already infested by this disease.

In Leaf-Blight Free Areas. For the blight-free countries a period of waiting is unavoidable in order to secure safe planting material represented by Groups 2 and 3. These clones are now growing under close observation at quarantine stations from which in the late Fall of 1942 first shipments of planting material for rapid multiplication will be made to blight-free countries and important blight-free districts of infested countries, such as in Ecuador, Colombia, and Venezuela. Therefore, until these valuable resistant clones can be multiplied and distributed throughout these countries where budding nurseries already have been established, only Group 1 clones will be available for planting. Seedlings for bud stocks from the 1941 and 1942 local seed crops already far exceed the total number needed for the proportional requirement of Group 1 in commercial plantings of 1942 and 1943. From the above discussion it is obvious that no commercial planting of more than mere test-plot size should be composed entirely of the merely semi-resistant Group 1 clones. Yet the many closely spaced seedling nurseries now growing must either be budded during 1942 and 1943, and the plants removed to the field or disposed of in some other way until ample budwood of Groups 2 and 3 clones is available. This problem has been a subject of much correspondence. Two procedures are suggested, but a third is mentioned for trial on a small scale.

The first procedure is based upon the joint recommendation of the well-known Guatemalan agriculturist, L. Lind Pettersen, and the superintendent of the U.S.D.A. Cooperative Station at Tela, Honduras, E. T. Stanwood. No doubt the same or modified procedure has occurred to others who have given close attention to the problem. In Honduras, Guatemala, Mexico, and some other countries the seed crop matures near the beginning of the rather prolonged dry season, which requires the planting of seed in closely spaced nurseries for irrigation and low-cost maintenance. Here the seedlings are grown for somewhat longer than one year or until the beginning of the following rainy season. Then it is proposed that they be budded and put into new budwood gardens in case further clonal multiplication is needed, or be transferred to the field to the extent of requirement of Group 1 clones. Groups 2 and 3, as far as available, would be multiplied in budwood gardens, and any excess of budded stumps also transferred to their apportioned and predetermined field positions. All remaining unbudded seedlings (the great majority) would then be stumped and transferred to the field for later budding at stake with Groups 2 and 3 clones as available. If budded at two to three years of age, the more rapid growth of such field buddings will tend to compensate the actual difference in ages in the field stand of trees. Naturally, as soon as budwood of all three groups of clones is equally abundant, all budding could be confined to the nursery.

The second procedure available to the blight-free countries involves exclusive use of Group 1 or possibly even higher yielding, but more susceptible clones such as some of those listed above for breeding gardens. These would be protected from leaf blight by top working with buds from highly resistant Belém seedlings now established in many of the countries, or with the same resistant Ford clones to be utilized for base budding in procedure one. The method is outlined in the following section.

Crown Budding High-Yielding Susceptible Clones with Resistant Clones. In addition to the selection of clones that best combine superior yield with resistance to leaf blight and other diseases and pests, the Ford Company (14)[5] has utilized to some extent the so-called double-budding procedure. There results from this, an established plantation tree, made up of three genetically different components: namely, (1) an unselected or partially selected seedling root stock on which has been budded in the usual way (2) a high-yielding stem, but somewhat susceptible to leaf blight and certain insect pests and on this, at a height of about 2½ meters, is placed (3) a bud which develops into a vigorous, highly resistant crown. Part 3 may be selected only for its vigor and resistance, but other important qualities such as shape and "wintering" or leaf changing characteristics should be considered if alternatives exist.

Theoretically this procedure may be expected to more than double the costs for planting material and delay somewhat its field establishment as compared with the usual single operation. This may be more than compensated, however, by increased yields and greater assurance of protection against blight than currently available alternative material, such as Group 1 clones budded and planted in the usual way. Wherever the procedure itself can be carried on successfully and suitable clones are used, there will be little doubt about satisfactory rubber production from the resulting composite tree. This is based on the known limited area of bark which supplies latex to the tapping cut; therefore the principal indirect effects of a different crown on a high-yielding trunk might conceivably be some unimportant qualitative and quantitative changes in the latex. Such should, of course, be investigated.

To the writer's knowledge, the possibility of a three-component rubber tree consisting of an ideal rootstock, an ideal stem, and an ideal crown was first suggested by Cramer as recorded in 1926 by de Vries (19) in Java. In 1934, Maas (20) reported some experimental crown buddings and emphasized the need of proper binding or supporting of the shoot after the successful bud patch union. His object was to prevent damage from *Oidium* mildew by top-budding high-yielding susceptible clones with mildew resistant, but low-yielding clones such as L.C.B. 870. This disease is not of annual or frequently recurring severity on young trees; thus there was afforded repeated opportunity and ample time for top-budding the trees with a resistant clone during the first years in the field.

To what extent an opportunity of this sort may be permitted by South American leaf blight in the districts of Latin America where it now occurs is unknown. It is likely that many localities will so favor the disease that any susceptible clone would not make sufficient growth to permit crown budding. The fact that conditions have permitted extensive use of the method on the Ford Belterra Estate in Brazil (Figures 7 and 8) is most encouraging and warrants careful study and climatic comparisons with other infested districts where its use might also be advantageous.

By demonstrating successful control of leaf blight in nurseries and budwood gardens by application of fungicidal sprays, M. H. Langford, pathologist of this Department, has indirectly provided a means for utilizing the double-budding procedure in all infested districts. This adds, of course, another item of cost in obtaining successful planting material, but, as explained above, the utilization of the double-budding procedure becomes a question of economic expediency to be weighed in relation to availability and promise of alternative planting materials.

In using the method, probably both budding operations should be confined to the nursery. This will be necessary in leaf-blight areas where economical spraying for control is required to produce vigorous plants. In that case an initially wider spacing than normal of the seedling nursery plants should be used to permit rapid growth of the clonal shoot, which is to form the stem of the composite tree,

and to make room for the second or top-budding operation at a height of at least two meters. One bud will be sufficient for securing a high percentage of "takes" if a favorable time and proper conditions are chosen. Then the top of the clonal stem is cut off and the "high stump", with its "sleeping" or slightly forced eye, is dug and transplanted to its permanent field position. In blight-free areas crown budding for insurance against leaf blight will probably be more economically done in the field than in the nursery because it would avoid the usual low percentage of die-back or other plant failures resulting from the transplanting of high stumps.

The following high-yielding, but leaf-blight-susceptible clones, may be recommended for trial to form the stem portion of the double-budded trees: GV-21, GV-31, GV-37, GV-42, GA-255, and GA-352. The first four numbers were distributed in 1941 to cooperating Latin American Government agencies having seedling nurseries in blight-free areas. The remaining two, and probably additional ones, will be distributed after further multiplication at the cooperating propagation stations in Honduras and Haiti. All of these clones were obtained in 1940 and 1941 from the Philippine plantation of Goodyear Tire & Rubber Co.

For crown budding, several near-immune or highly resistant Belém or other Brazilian seedlings may be used. Indiscriminate mixing in the planting of at least a half dozen genetically different crowns is desirable to counteract adaptation or possible specialization and consequent damage by the leaf-blight fungus which might otherwise occur on a mono-clonal canopy. The clones for crown budding should also, of course, be carefully selected on other characters, such as vigor, resistance to wind breakage, and as to form in relation to prospective type of planting. For example, crowns with fairly narrow and sharply ascending branches are more suitable for close spacing in hedge-type plantings as well as for interplanting with coffee and other crops. Crowns of other species of *Hevea*, as *H. benthamiana*, *H. spruceana*, and *H. guyanensis* are reported to have been used for control of both diseases and pests on the Ford estates. Extremely vigorous interspecific hybrids, if resistant to leaf blight, should also receive the same experimental attention for this purpose as the *H. brasiliensis* × *H. spruceana* hybrids have in Sumatra (21) for root stocks.

Rotation Planting Scheme. In addition to the two methods just described, a third procedure is suggested for limited trial because of its possible merit as well as to enable immediate planting of Group 1 clones in the blight-free areas. According to this method, the Group 1 clones would be planted in widely spaced hedges some 12 to 16 meters apart and later be interplanted with hedges composed of a mixture of clones from Groups 2 and 3 when these are available. Should leaf blight invade and damage the less resistant Group 1 clones, these could be top-worked, if still quite young, or cut out, and the rows replanted with new high-yielding and resistant clones available by that time. Thus a changeover or convertible system is provided to take advantage of constantly more improved planting material or to meet possible disease exigencies.

Schweizer (22), of the Besoeki Experiment Station in Java, and Schmöle (23), of the A.V.R.O.S. Station in Sumatra, have recommended trial of this system in connection with hedge plantings where heavy thinning will be done. Thus, in closely spaced hedge plantings of 1 x 10, 1 x 9, or 1 x 8 meters every other row might be considered a "dummy" row which later, after severe tapping, would be replaced with newer and better planting material. This would permit renewal of the garden without loss in production. In the "dummy" or catch-crop row special seedlings and improved clones would be used, while in the other rows proved clones or better-known material would be planted. Thus, "dummy" rows alternate with "good rows" at a spacing of 1 x 20, 1 x 18, or 1 x 16 meters.

Photo by Karl D. Butler

Fig. 7. A Three-Part Rubber Tree on Ford Belterra Estate, Brazil. A High-Yielding, But Blight-Susceptible Stem Was Budded on a Seedling Root Stock and Later Top-Budded with Resistant *Hevea Spruceana*. The Vigorous Crown Is Only One Year Old

Fig. 8. Close-up of the Tree Which Is Shown in Figure 7, Illustrating the Excellent Results from Top-Budding

The very limited experimental data cited by the above-mentioned and other investigators in the East emphasize the speculative nature of this planting system. Since it is particularly adapted for mixed cropping, it could be tried out to best advantage in Latin America in unprofitable lowland coffee areas. This would involve replacing at suitable intervals present rows of coffee with hedges of *Hevea* representing the Group 1 clones and later removing an additional row of coffee between the first planted hedges to accommodate the clones of Groups 2 and 3. After a few years the remainder of the coffee with its shade trees would be cut out, leaving a pure stand of *Hevea*. A spacing within the hedge or row of two meters instead of one would be more appropriate with the planting material now available. For a permanent mixed culture of *Hevea* and coffee a much wider distance between the *Hevea* hedges than those given above would be necessary. This type of culture is discussed in a separate section of this paper.

From the brief outline of this rotation scheme, the need of some experiments is obvious. The theoretical advantages, however, apparently warrant some experiments to determine the suitability of present *Hevea* planting material, best spacing of the trees, and the effect on yields of coffee or other temporary or permanent intercrops.

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(To be concluded)

German Patents Relating to Vinyl Polymers—VIII

M. Hoseh

PATENT (80)[1] describes an important improvement in the preparation of acetals of polyvinyl alcohols by the method given in (74).[2] The improvement consists in that the acetylization is conducted under normal conditions, i. e., without the volatile solvent. The contaminated product is dissolved subsequently in a solvent which is gaseous at ordinary pressures, but liquefies under the working pressure. The solution is injected into pure water. By doing so the solvent volatilizes and the acetal precipitates in a finely subdivided form, practically free of any impurities. The precipitate is washed and dried as usual.

Plastic masses that are very resistant and do not lose their plasticity, when once formed, are obtained by treating polyvinyl ketones with alkaline substances, according to (81). The alkaline substance, such as hydroxides and carbonates of the alkali and alkali earth metals, NH_4OH, piperidine, pyridine, etc., can be added either during polymerization or to the ready polymer before it is formed. In the former case the alkali is added to the emulsion or suspension of the polymerizable mixture. In the latter case the polymerized product is mixed with the alkali by grinding, then pressed into the desired forms, and heated.

Plastic and thermoplastic masses are obtained by condensing aromatic compounds having at least two Cl atoms in their aliphatic side-chains, with alkali, alkali earth, or NH_4 polysulphides. Suitable halo compounds are, benzalchloride, benzotrichloride, 1, 4-bis-(chloromethyl)-benzene, 1, 2-bis-(chloromethyl)-benzene, bis-(chloromethyl)-mesitylene, 4, 4'-bis-(chloromethyl)-diphenyl, etc. The halo compounds may be substituted in the nucleus with alkyl, aralkyl, halo, or nitro groups. The condensation may be of these compounds alone or mixed with dihaloparaffins such as ethylene chloride, propylene chloride, with dihalo ethers such as β, β'-dichloroethyl ether, α, β-dichloro ether, or with dihalo alcohols such as glyceroldichlorohydrin. The condensation is conducted depending on the reactants at ordinary or elevated temperatures. The products' properties depend on the constituents. They are used in lacquers, in the rubber industry, and in plastics (82).

A shrinking substance is produced from thermoplastic highly polymerized vinyl compounds, according to (83). Suitable combinations are: mixed polymers of 15 parts of polyacrylicmethyl ester, and 85 parts of polyvinyl chloride or a mixture of polyvinyl acetate and polyvinyl alcohol formaldehyde acetal; also chlorinated polyvinyl chloride. These products are not inflammable; they are water-repellent and have a low softening point. They are used as caps for bottles, etc. To use them the polymer is mixed with a plasticizer, pigments, and filler and dissolved in a volatile solvent. The neck of the bottle is dipped into the solution; the solvent vaporizes, whereupon a tight-fitting cap is left. Another way is to pressure-mold the powdered polymer. The molded piece is warmed and pulled over the desired article. Upon cooling, the molded piece shrinks to fit.

The difficulties hitherto encountered in the preparation of thin, uniform foils from polyvinyl compounds are overcome by the procedure described in (84), whereby powdered polyvinyl chloride or mixed polymers of it along with other polymerizable compounds are ground together with water to a homogeneous paste. The grinding is successfully accomplished in a disk mill, colloid mill, or similar apparatus. During the grinding, pigments, plasticizers, fillers, etc., may be added if desired. The homogeneous paste thus obtained is applied on metal plates with the aid of well-known appliances. Next the water is evaporated using heat, vacuum, or both, to leave a fine powder on the metal plate. The powder, submitted to a temperature just above its softening point and to simultaneously applied pressure, fuses, yielding a thin, uniform foil.

A simple method for producing nitrogeneous polyacrylates is given in (85), by which polyacrylic acid esters, mixed polymers containing such esters, or derivatives of these esters are acted upon by primary or secondary amines, or the corresponding polyamines. Depending on the starting materials, the reaction is conducted at 90-150° C. Promoters, *e.g.*, slight amounts of alkalis or alkaline reacting substances are added advantageously. The amines are preferably added in equivalent amounts. Among the suitable bases are: NH_3, methylamine, diethylamine, butylamine, octadecylamine, ethanolamine, propanediolamine, ethylenediamine, diethylenediamine, aniline, sodium sulphanilate, and piperidine. If solvents or diluents are required for the reaction, MeOH, EtOH, or benzene is employed.

Patent (86), an addition to patent No. 611,380, deals with stabilization of polyvinyl chloride. As stabilizers can be used compounds containing an ethylene oxide (C_2H_4O) group. Among these are: alkyl and aryl derivatives of C_2H_4O, epichlorohydrin, glycidol, its ethers, particularly phenyltolyl and phenylxylyl ethers, α and β-naphthyl ether, glycidic acid, its esters, and also akyl and aryl derivatives. If the substance is to be employed as a lacquer or coating material, the stabilizer is added as a solution along with other substances. If the polymer is to be pressure-molded, the stabilizer is incorporated along with a gelatinizing agent in a kneading machine. Usually 1%-4% of the C_2H_4O is required.

Acrylic acid esters and their homologs are polymerized to yield solid products without the use of emulsifiers, according to (87). The polymerization is conducted in water under vigorous stirring. The volume of water is such that it suffices for the duration of the reaction. It is advantageous to add to the water a neutral salt, e.g., NaCl, or such organic solvents as benzene, MeOH, etc. The rate of polymerization is increased by using promoters such as light, heat, pressure, oxygen, etc. The viscosity of the polymer solutions is controlled by the addition of phthalic esters, oils, and other plasticizers. This new procedure shortens considerably the time required for obtaining a solid product. The yield is 100% of the theoretical value. Should the yield fall below this value, the solids are removed, and the residue is re-used.

A markedly improved method for polymerizing methacrylic acid esters is described in (88). The methacrylic acid ester, such as methyl-, ethyl-, propyl-, butyl-, isobutyl-, and phenylmonomethacrylate, glycoldimethacrylate, or their mixture, is polymerized in a closed vessel equipped with a kneading device and a reflux condenser. The polymerization is furthered by the addition of promoters, *e.g.*, benzoyl peroxide, acetylbenzoyl peroxide, H_2O_2, tetraethyl lead, $NaBO_3$, acetic anhydride, or $NaHSO_3$. Fillers such as wood flour, ground paper, clay, gypsum, barite, chalk, talc, or asbestos may be incorporated during the

[1] For details on patents see end of article.
[2] See INDIA RUBBER WORLD, June, 1942, p. 249.

polymerization, as well as pigments, metallic powders, etc. If the product is to be molded, it is advisable to incorporate lubricants, e.g., carnauba wax, Al palmitate, Zn stearate, or stearic acid. The product is obtained as a solid, pure, granular material.

High molecular polymers of isobutylvinylate are valuable impregnation and filming agents for such substances as metals, wood, textiles, paper and objects made from nitrocellulose or cellulose acetate, according to (89). The polymer is obtained by treating pure isobutyl vinyl ether with boron halide, e.g., BF_3 or its compounds, at a temperature below 10° C. If desired other substances like plasticizers and fillers may be incorporated. The polymer is dissolved in an ether, ketone, ester, chloro hydrocarbon, benzine, paraffin oil, or any other suitable solvent, and the solution used for impregnating. The filmed and impregnated materials are resistant to weathering, chemical corrosion by acid or alkaline vapors, and make good insulators.

Patent (90) contends that the properties of vinyl chloride polymers as well as those of mixed polymers of vinyl chloride and other polymerizable compounds are greatly improved if treated with alkaline substances. Such improvement is noticeable particularly in mixed polymers of vinyl chloride and acrylic esters or vinyl esters. A dilute solution of NaOH can be used for this purpose.

Patent (91) describes an effective method for making plates and sheets of vinyl and acrylic polymers free of air bubbles. The polymerization is done in a special apparatus resembling a filter press, where compartments in which polymerization takes place alternate with compartments equipped for heating and cooling. The former are lined with impermeable paper or like material.

Polymerization products of isobutylene are extensively used to ameliorate lubricating oils. For best results the degree of polymerization should be carefully controlled so as to obtain stable products. With this in view (92) advises the use of inhibitors during the polymerization process. The inhibitors are added in such quantities that they impede the progress of polymerization, but do not stop it entirely. The addition of inhibitors requires a lowering of the working temperature. The temperature is lowered by 20-50° C. from the temperature used without inhibitors. Suitable inhibitors are mercaptans, sulphides, H_2S, elemental S, alkyl halides such as chlorides or fluorides. These are strong inhibitors and must be used in amounts much less than 1%. Other inhibitors, e.g., butylene, propylene, HCl or HF, may be used in amounts of 10-25%.

Foils made from polyvinyl chloride have their mechanical properties greatly improved by heating them for a short time at a temperature above 120° C. according to (93). Thus polyvinyl chloride is dissolved in a volatile liquid such as chlorobenzene, butyl acetate, dioxane, butyleneglycolformal, cyclohexanone, etc. The solution is cast into foils of the desired thickness and dried as usual.

Thin foils (less than 0.1 mm.) of polyvinyl alcohol, polyvinyl chloride, polyacrylic acid, their derivatives and mixed polymerization products are produced by a process given in (94), whereby the powdered polymer is mixed with about 10% of acetone or acetone-benzene mixture. The mixture is rolled out to the desired thickness on heated rolls. The solvent vaporizes leaving a thin foil behind.

Patent (95) relates to abrasive wheels and similar objects. Polymeric compounds of vinyl, acrylic acid, or styrol are dissolved in a mixture of furfurol and cresol, or a mixture of any high boiling aldehyde and phenol. To the mixture is preferably added hexamethylenetetramine. The abrasive material is added to the solution, and the whole mass pressed in the cold to the desired shape. Next the pressed articles are heated to about 180° C. at ordinary pressure, resulting in a non-fusible substance.

As promoters for polymerization of vinyl chloride by itself or along with vinyl acetate, acrylic acid esters, acrylic acid nitriles, styrol, indene, coumarone, butadiene, α-chlorobutadiene, etc., is used a mixture of H_2O_2 and organic per acids, as performic acid, or peracetic acid, according to (96). A mixture of H_2O_2 and compounds such as $NaBO_3$ or acetic anhydride is also suitable for this purpose. The resulting products are used for thermopressing, extrusion, lacquers, films, threads, coatings, etc.

New valuable polymerization products are obtained from vinyl ethers of polyhydric mercaptans (97). The mercaptans may be of the aliphatic, aliphatic-aromatic, aromatic, hydroaromatic, or heterocyclic series having only one vinyl group on the S atom. Suitable for this reaction are: the thiovinyl ethers of alkyl- and hydroxyalkyl mercaptans such as ethyl-, propyl-, isobutyl-, stearyl-, or oleyl mercaptans; thioalkylglycolene, or thioglycerol; the vinyl ethers of aromatic mercaptans, e.g., thiophenol, thiocresol, di-, and polythiobenzene, naphthalene, anthracene and anthraquinone, etc. The reaction is catalyzed by acid reacting compounds, e.g., BF_3, $ZnCl_2$, $AlCl_3$, $COCl_2$, SO_2, CO_2, $SOCl_2$, HF, HCl, and the halogens; and compounds yielding O, e.g., organic and inorganic peroxides, O_3, and air. The polymerization is conducted so that the vinyl group is not split off; therefore dilute acids and anhydrous mineral acids should not be present together with OH containing compounds such as alcohols. Alkali oxides, hydroxides and carbonates do not interfere. Temperatures above 200° C. should be avoided. The rate of polymerization is controlled by adding alkali oxides, hydroxides, or carbonates, $Ca(OH)_2$, or organic bases as methylamine, dimethylamine, butylamine, piperidine, aniline, *p*-phenyldiamine, dimethylaniline, certain alcohols as EtOH, cyclohexanol, glycol, as well as phenols, hydroquinone, or pyrogallol. The polymerization can be conducted with the monomers proper, their solutions, or emulsions. Plasticizers as dibutylphthalate, tricresyl phosphate, polybenzylnaphthalene, etc., may be incorporated if desired. Also other polymerizable compounds, pigments, fillers, etc., may be added. The properties of the product and therefore its commercial use are entirely determined by the nature of the starting material, catalyst, and regulator employed, procedure of polymerization, plasticizer, and filler added, etc.

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(To be continued)

Electric Drives for Continuous Processing Machinery

J. Z. Linsenmeyer[1]

FOR the past several years there has been a noticeable trend in the rubber industry toward continuous processing machinery providing for what might be termed line-production operating methods. This trend has resulted in many new machinery developments, and this new and improved equipment has not only greatly accelerated production schedules, but also has provided for much closer process control with consequent improvement in uniformity and quality of the product.

It is, of course, impossible to cover all of the many new applications, but the operating principles of a few of the more interesting drives are described below.

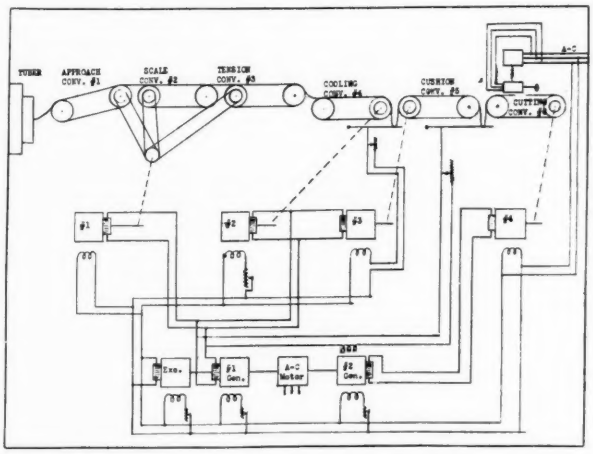


Fig. 1. Schematic Layout of Tread Conveyer Drive

Twelve Tire Treads a Minute

Twelve tire treads every minute is the production rate of the completely automatic system, shown schematically in Figure 1. This system consists essentially of a tuber or tubers which feed the rubber stock on to a series of conveyers, of the package belt type, where it is weighed, cooled, and finally cut to accurate lengths.

The rubber stock is extruded from the tuber (see Figure 2) on to the approach conveyer #1. This conveyer then carries the stock to the scale, conveyer #2, where it is weighed for proper gage. Conveyer #3 is a tension conveyer which functions to maintain a constant pull on the rubber to insure that correct weight measurement is

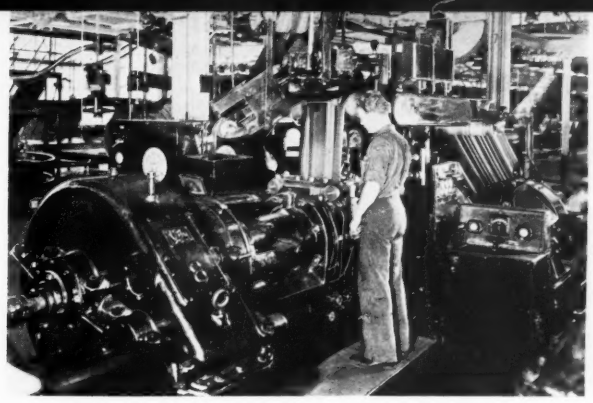


Fig. 2. Complete Tire Surface Including Tread and Sidewall Is Extruded, as Shown by the Vertical Sheet Directly in Front of the Operator, from the Tubers at Operator's Left. The Tread Passes on to the Weighing Conveyer just beyond the Operator's Head and Then by Conveyer Belt through the Floor to the Cooling Conveyers

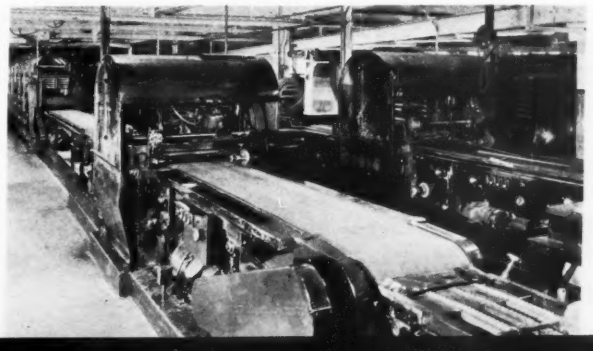
obtained. From here the rubber is passed on through the water cooling chamber, where it is carried on conveyer #4 through a continuous water spray. The stock then continues on conveyer #5 where additional strips of rubber may be added mechanically. Conveyer #6 contains the tread-cutting equipment, and it is here that the stock is cut to accurate lengths; the length of tread is preset to meet the tire size for which it is intended. See Figure 3.

The conveyers are driven by direct current motors operating in an adjustable voltage system. A master rheostat arranged in the field circuit of the main generator, #1, provides for close speed adjustment over an 8 to 1 operating range. The four motors are maintained in synchronous speed relation by compensating rheostats located between each motored section. The rheostats are operated from dancer rolls between the conveyers; and a variation in the load of any of the conveyers, which will affect the speed of the motor, is immediately and automatically compensated for by the operation of the rheostats.

In production operation, conveyers #1 to #5 inclusive, operate continuously, but conveyer #6, the cutter conveyer, must stop for each cutting operation. The number of times which this conveyer must stop and start is, of course, dependent on the tread production rate required; the production rate is readily adjustable to meet plant facilities. The frequent stopping and starting of this conveyer imposes a rather severe duty on the motor, as it is essential that this unit be able to accelerate rapidly to its preset operating speed, and likewise be able to brake quickly to a stop for the cutting operation. Special design characteristics have been incorporated into the motor to meet these demands. The quick braking action is obtained by a combination of regenerative and dynamic braking.

Two alternating current squirrel-cage type of induction motors operate the cutting equipment. One motor drives the rotating disk type of knife, and it in turn is driven traversely across the conveyer by the second motor. Quick stopping of the traverse motor is obtained by means of direct current dynamic braking.[2]

Fig. 3. Tread enters the Water and Cooling Conveyers on Extreme Left. Thence Tread Passes on to the Cut-Off Conveyer in the Center Where It Is Cut into Strips 57¼ Inches Long. The Cutter Wheel and Cut-Off Mechanism Is Located under the Sheet Steel Canopy. The Tread Pieces Are Carried Away by the Chain Conveyer in Lower Right Corner



[1] Industry Engineering Dept., Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

[2] The motor is disconnected from the alternating current supply, and a direct current low voltage supply is connected across the two motor leads.

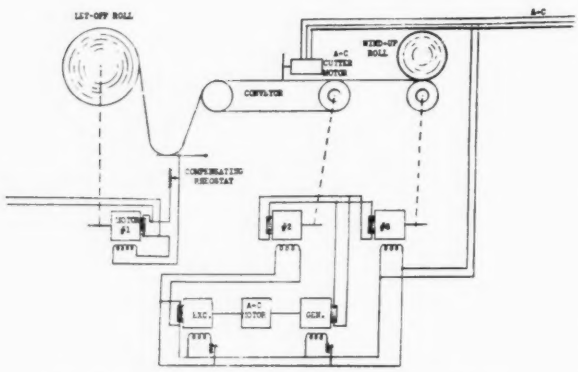


Fig. 4. Schematic Outline of the Bias-Cutter Equipment

Power for the conveyer system is supplied from a four-unit motor generator set. One generator supplies motors #1, #2, and #3; while the second generator supplies only motor #4, which drives the cutting conveyer.

The control is arranged for complete automatic operation, providing for preset operating speeds and various operating safety features.

Horizontal Bias Cutter

The horizontal bias cutter shown schematically in Figure 4 consists of a let-off roll, a cutter conveyer, and a wind-up roll. The roll of treated fabric, which is to be cut into strips of accurate width for the tire building process, is placed on the let-off stand, and the fabric is threaded over a dancer roll on to the cutter conveyer. After the cutting operation the cut fabric is carried by the conveyer to the wind-up roll where it is wound in a close roll between a wrapper of canvas.

The let-off reel is driven by an adjustable speed direct current motor, which runs continuously and thus provides a constant feed of material on to the conveyer. The conveyer and the wind-up reel are driven by direct current motors operating in an adjustable voltage system. The conveyer and the wind-up reel operate intermittently as they must be brought to a complete stop for each cutting operation. As this unit is capable of cutting better than 30 20-inch wide strips per minute, both the motor and the control equipment must be designed for very rapid response.

Special design characteristics enable these motors to start and accelerate the conveyer very rapidly to the preset operating speed. Quick stopping is obtained by a scheme of regenerative braking to a preset low speed from which point the conveyer is brought to an accurate stop by means of dynamic braking.

When in production operation, at the instant that the conveyer and the wind-up reel are being brought to a standstill, the cutting mechanism is actuated. A bar clamps and holds the fabric in place, while a vertical double-edged knife is pulled across the fabric. An alternating current, squirrel-cage-type induction motor of special design providing for high torque and a low WR^2 (low inertia) rotor, quickly pulls the cable mounted knife across the 60-inch wide conveyer. The rapid braking action, required when the knife comes to the end of the fabric, is obtained by application of direct current dynamic braking to the induction motor.

Power for the two motors operating in the variable voltage system is supplied from an A.C.-D.C. motor generator set consisting of an alternating current, squirrel-cage type of induction driving motor, a direct current generator which supplies the armature circuit of the two motors, and an exciter generator which supplies the excitation for the motor and the generator fields and the control circuit.

Continuous Fabric Rubberizing Process

The complete unit is made up of a number of individual sections which are operated in range or tandem and provide for the continuous processing of tire fabric. Referring to the schematic diagram shown in Figure 5, the untreated fabric is taken from the let-off roll at one end of the unit and drawn through a series of tanks filled with a gum solution which thoroughly saturates the cord fabric. In a continuous operation the fabric is then drawn through the large drying chamber and rewound on the wind-up roll at the other end of the unit. To insure uniform processing of the fabric very close regulation of the cloth tension is maintained throughout the complete system.

This unit makes use of an adjustable voltage drive which permits of close speed control over a wide operating range. The complete drive consists of four direct current motors —let-off motor #1, the saturator motor #2, the drier motor #3, and the wind-up motor #4. Power for these motors is supplied from a three-unit motor generator set consisting of a squirrel-cage induction driving motor, the direct current main generator and a direct current exciter generator. The motor operated rheostat arranged in the field circuit of the main generator will provide for close speed adjustment throughout the production range. An interlock on the motor operated rheostat makes it necessary that it be in the low voltage position before the starting control circuit can be closed. The rheostat automatically returns to this starting position when, for any reason, the generator circuit is opened.

It may be noted from the diagram that a compensating rheostat is arranged between each machine section. Each rheostat is operated from an individual dancer roll sensitive to the movement of the fabric, and for any slight variation in load conditions the rheostat will function to provide immediate correction and maintain the motor in synchronous speed relation.

Motor #1 driving the let-off roll is so arranged that it can be stopped and started by means of push-button control, while the remainder of the machine is in operation. The control also provides this same feature for motor #4, and in addition a foot operated switch is arranged for transferring this motor on to the constant voltage exciter circuit for the inching operation, which is of advantage when threading in a new roll. Quick stopping of the entire unit is accomplished with dynamic braking on motors #2, #3, and #4 and a solenoid operated mechanical brake on motor #1.

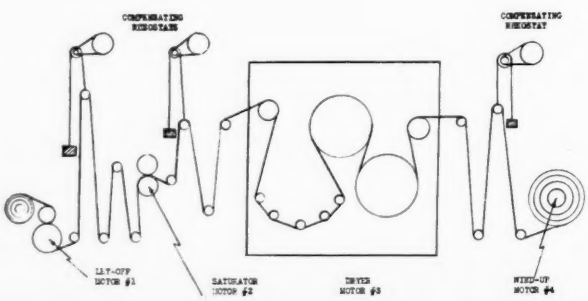


Fig. 5. Schematic Layout of the Fabric-Rubberizing System

Additional Rubber Orders

THE following are copies of three more amendments to orders relating to rubber and products thereof, and also a new supplementary order, all issued within the past month to further the rubber conservation program:

Amendment No. 10 to Supplementary Order No. M-15-b, Rubber and Rubber Products[1]

Section 940.3 (Supplementary Order No. M-15-b) is hereby amended by inserting at the end thereof the following new paragraph designated paragraph (c):

(c) *Restrictions on the importation of Rubber, Latex, Reclaimed and Scrap Rubber, and Balata and products thereof.* No Person, other than Metals Reserve Co., Defense Supplies Corp., Rubber Reserve Co., or any other subsidiary of Reconstruction Finance Corp. organized under Section 5(d) of the Reconstruction Finance Corp. Act, as amended, or any agent acting for one of them, shall, without the written authorization of the Director of Industry Operations, import, purchase for importation, or make any contract or other arrangement for the importing of any Rubber, Latex, Reclaimed and Scrap Rubber, or Balata, whether in crude, partly processed, or processed form, or any finished or partly finished product or material made in whole or in part from any of the foregoing. For the purposes hereof "import" means to transport into the continental United States from any foreign country or from any territory or possession of the United States, and shall include a release from the bonded custody of the United States Bureau of Customs.

This Order shall take effect as of the date of its issuance.

Issued this 19th day of June, 1942.

J. S. KNOWLSON
Director of Industry Operations

Amendment No. 6 to Supplementary Order No. M-15-b-1 to Restrict the Use and Sale of Rubber[1]

Section 940.5 (Supplementary Order No. M-15-b-1) is hereby amended as follows:

1. By striking out Items (11) and (12) under the heading "Passenger Friction" in subdivision (b) of List 7 attached thereto and substituting the following:

Passenger Friction

Description of product	Compounds to Be Used: Passenger Friction	Tread
(11) Industrial pneumatic tires		
(i) Single tube—all sizes	E (including tube)	F
(ii) Straight side—under 6.00 (except 4.00—8 regular and H. D.)	E	F
(iii) Straight side—6.00 and up	D	C
Exception 1—4.00-8 regular	FF	F
Exception 2—4.00-8 heavy duty	D	C
(12) Industrial solid tires		
(i) Stretch-on or Hollow Center	—	F
(ii) Molded-on for hand operated vehicle	—	FF
(iii) Molded-on for power driven or power drawn vehicles	—	A
(iv) Pressed-on	—	A
(v) Metal base demountable	—	A

2. By inserting the following new subparagraph immediately after subparagraph (b) (15) thereof:

(16) Rubber insulating tape — List 16

3. By attaching thereto the attached additional list designated List 16.

This Order shall take effect as of the date of its issuance.

Issued this 12th day of June, 1942.

J. S. KNOWLSON

SUPPLEMENTARY ORDER NO. M-15-b-1 AS AMENDED
LIST 16

Specifications for the manufacture of rubber insulating tape.

(1) Rubber insulating tape shall be manufactured only from an unvulcanized or partially vulcanized Rubber and Reclaimed Rubber compound.

(2) The thickness shall be .027 inches, plus or minus .003 inches.

(3) Rubber, as defined in paragraph (a) (1) of Supplementary Order No. M-15-b shall not be used in proportions which will require more than seven pounds of Rubber per 27,000 square inches of tape.

(4) No Latex shall be used in the manufacture of such tape.

Amendment No. 3 to Conservation Order No. M-124[2]

Section 1173.1 (Conservation Order No. M-124) is hereby amended in the following respect:

Subparagraph (d) (5) is amended by striking out the words "Any rubber yarn, latex yarn or elastic thread," therein, and inserting in lieu thereof the words "Any covered rubber yarn. Covered latex yarn, or covered elastic thread, of a count of 61, or finer."

Issued this 26th day of May, 1942.

J. S. KNOWLSON

Supplementary Order No. M-15-e to Restrict Transactions in Rubber Life Saving Suits[1]

It is hereby ordered that:

940.7 (a) *Definitions.*

(1) "Life Saving Suit" means any buoyant watertight suit made in whole or in part of rubber, latex, reclaimed rubber, scrap rubber or any of the compositions generally known as synthetic rubber, designed for use by seamen as a device for rescuing or preserving the lives of seamen from wrecked vessels.

(2) "Person" means any individual, partnership, association, business trust, corporation, governmental corporation or agency, or any organized group of persons, whether incorporated or not.

(b) *General restriction on the purchases and sale of Life Saving Suits.* Except as provided in paragraph (c) hereof no Person shall purchase any Life Saving Suit except:

(1) To provide necessary equipment for ocean and coastwise cargo and tank vessels of over 1,000 gross tons for the purpose of providing one approved Life Saving Suit for each person on board as required by regulations prescribed by the United States Coast Guard (Title 46, Chapter II, Subchapter C, part 153.12); and

(2) Only upon compliance with rules, regulations, instructions or directions concerning the purchase and sale of Life Saving Suits to be issued from time to time by the United States Coast Guard.

No Person shall sell any Life Saving Suit except pursuant to such rules, regulations, instructions or directions issued by the United States Coast Guard, or if he knows or has reason to believe that such Life Saving Suit is being acquired or is to be used for any purpose other than is permitted by this Order.

(c) *Exceptions.* The provisions of paragraph (b) shall not prohibit the purchase or sale of Life Saving Suits in any case in which:

(1) Such purchase or sale has been expressly authorized by the Director of Industry Operations.

(2) Such purchase is made by or for the account of the United States Army, Navy or Coast Guard.

(3) Such purchase is made by any agency of the United States for the account of any foreign country under the provisions of the Act of March 11, 1941, entitled "An Act to Promote the Defense of the United States"

(*Continued on page 364*)

[1] Title 32—National Defense, Chapter IX—War Production Board, Subchapter B—Division of Industry Operations. Part 940—Rubber and Products and Materials of Which Rubber Is a Component.

[2] Title 32—National Defense, Chapter IX—War Production Board, Subchapter B—Division of Industry Operations. Part 1173—Rubber Yarn and Elastic Thread.

Rubber Reserve Co. Circulars

Circular No. 3 on the Sale and Purchase of Crude Rubber, Normal or Concentrated Latex, Deproteinized Rubber and Sprayed Rubber

Reference is made to Paragraph (e) of Amendment No. 3 to Supplementary Order No. M-15-b, issued by the Priorities Division of the Office of Production Management on January 23, 1942, reading as follows:

General Restriction on the Sale of Rubber and Latex

Until otherwise ordered by the Office of Production Management, no Person shall sell, trade or transfer the ownership of any Rubber or Latex, and no Person shall accept any such sale, trade or transfer of ownership, except (1) as expressly permitted by regulations prescribed by Rubber Reserve Co., or (2) in those cases in which specific authorizations may be issued by the Office of Production Management; provided that nothing in this paragraph shall be deemed to prohibit the sale of unvulcanized rubber products which were in finished and marketable form on December 11, 1941, or which have become finished and marketable at any time after that date pursuant to processing not prohibited by any orders or other instructions issued by the Office of Production Management.

Pursuant to the restrictions on the sale and purchase of Rubber and Latex established by the foregoing Paragraph, the following regulations are prescribed by Rubber Reserve Co.

Sale of Crude Rubber

1. Crude rubber will be sold to manufacturers in accordance with the procedure outlined in Circular No. 1, dated September 12, 1941, which is in effect at the present time, with the added provision, however, that each request for the issuance of a Crude Rubber Purchase Permit must be accompanied by an affidavit, in the form attached hereto designated as Exhibit "A", signed by a duly authorized representative of the manufacturer. A separate affidavit must be executed in connection with each request for a purchase permit, and the affidavit should show the total stocks of rubber on hand, irrespective of grades, at the time of the execution thereof.

2. A sample copy of the Crude Rubber Purchase Permit is attached hereto for informative purposes only, and should not, in any case, be filled out by a manufacturer, since all permits are issued from this office.

Purchase of Crude Rubber from Manufacturers

3. Upon receipt of an appropriate request from a manufacturer, Rubber Reserve Co. will arrange for the purchase of the manufacturer's surplus stocks of rubber at a price equal to the amount paid by the manufacturer for the rubber, plus freight, insurance, and charges incurred, if any, for the storage of the rubber in commercial warehouses.

4. Manufacturers owning surplus stocks and wishing Rubber Reserve Co. to purchase such stocks should address a letter to the Purchase Department of Rubber Reserve Co., setting out the exact amount of rubber involved, by R. M. A. types and grades, the location of the rubber, and detailed information with respect to the cost thereof. Arrangements will then be made to have the rubber inspected and moved to warehouses for storage. Immediately upon completion of the inspection, and after taking into consideration quality and weight adjustments, if any, the manufacturer should forward to the Purchase Department, Rubber Reserve Co., an invoice certified as to the correctness thereof, covering the price of the rubber, upon receipt of which, after verification, a check will be prepared and forwarded to the manufacturer without delay.

5. It is possible that manufacturers may have rubber on hand which does not conform to the established R. M. A. types and grades, and while this fact does not preclude the sale thereof to Rubber Reserve Co., in such cases, full information should be furnished with respect to the grades involved.

Purchase of Crude Rubber from Dealers

6. Under the terms of Amendment No. 3 to Supplementary Order No. M-15-b, effective February 1, 1942, all sales, trades or transfers of the ownership of rubber are prohibited except as expressly permitted by regulations issued by Rubber Reserve Co. or specifically authorized by the Office of Production Management. As a result, all contracts between dealers and manufacturers unfilled as of February 1, 1942, are automatically cancelled.

7. To relieve this situation, upon receipt of an appropriate request from a dealer, Rubber Reserve Co. will purchase the dealer's undelivered stocks of rubber at a price equal to the actual amount paid by the dealer for such rubber, plus freight, insurance, charges incurred, if any, for the storage of the rubber in commercial warehouses.

8. Dealers owning undelivered stocks and wishing Rubber Reserve Co. to purchase such stocks, should advise the Purchase Department of Rubber Reserve Co. of the stocks on hand, by R. M. A. types and grades, the location of the rubber, and detailed information with respect to the cost thereof. Arrangements will then be made to have the rubber inspected and moved to warehouses for storage. Immediately upon completion of the inspection, and after taking into consideration quality and weight adjustments, if any, the dealer should forward to the Purchase Department, Rubber Reserve Co., an invoice certified as to the correctness thereof, covering the price of the rubber, upon receipt of which, after verification, a check will be prepared and forwarded to the dealer without delay.

9. It is possible that dealers may have rubber on hand which does not conform to the established R. M. A. types and grades, and while this fact does not preclude the sale thereof to Rubber Reserve Co., in such cases, full information should be furnished with respect to the grades involved.

10. The foregoing procedure relates not only to dealer's stocks on hand, but also to rubber afloat and rubber purchased for future shipment, regardless of the origin of the rubber.

Sale of Normal or Concentrated Latex, Deproteinized Rubber and Sprayed Rubber

(The provisions set forth under this title supersede those contained in Circular No. 2, dated September 22, 1941.)

11. With the consent and approval of the Office of Price Administration, the following sales prices are hereby established for Normal or Concentrated Latex, Deproteinized Rubber and Sprayed Rubber F. O. B. point of shipment:

	Liquid Latex	
	Normal	Concentrated
Tank Car	.2895	.3065
Carload Drums	.3125	.325
Less Carload	.3175	.33
Less than 10 Drums	.3225	.335
Less Drum	.3825	.395
Deproteinized Rubber	.375	
Sprayed Rubber	.2575	

12. Under the terms of Amendment No. 3 to Supplementary Order No. M-15-b, effective February 1, 1942, all sales, trades or transfers of the ownership of Normal or Concentrated Latex, Deproteinized Rubber and Sprayed Rubber are prohibited except as expressly permitted by regulations issued by Rubber Reserve Co. or specifically authorized by the Office of Production Management. As a result all contracts between distributers and manufacturers unfilled as of February 1, 1942, are automatically cancelled.

13. For the present, at least, Normal or Concentrated Latex,

Deproteinized Rubber and Sprayed Rubber will be sold to manufacturers by certain distributers acting under the supervision of Rubber Reserve Co. rather than by Rubber Reserve Co. acting directly. For this purpose, Rubber Reserve Co. has designated the following companies as distributers: United States Rubber Co., General Latex & Chemical Corp., Revertex Corp. of America, Heveatex Corp., B. F. Goodrich Co., Goodyear Tire & Rubber Co., Firestone Tire & Rubber Co., Dunlop Tire & Rubber Co., American Anode, and Charles T. Wilson Co., Inc. In order to secure these types of rubber, manufacturers must obtain a permit from Rubber Reserve Co. for the purchase thereof, and each request for a permit must be accompanied by an affidavit in the form attached hereto, designated as Exhibit "B."

14. Requests for a permit to purchase these types of rubber should be addressed to Sales Department, Rubber Reserve Co., 811 Vermont Ave., Washington, D. C., and mailed at least 30 days in advance of the date on which delivery is desired. All requests for a permit to purchase Normal or Concentrated Latex must state clearly the type or types required, the quantity of each type or types in U. S. Gallons and net dry pounds, the percentage of concentration, the desired delivery date and whether delivery will be taken in drums or tank cars. All requests for a permit to purchase Deproteinized Rubber and Sprayed Rubber must state clearly the type of rubber required, the quantity of each type and the desired delivery date.

15. Upon receipt of the manufacturer's request, accompanied by the required affidavit, Rubber Reserve Co. will issue a permit in triplicate and forward such permit to the manufacturer by Registered Mail, provided the manufacturer has complied with the established requirements of the Rubber and Rubber Products Branch of the Office of Production Management. If it is indicated in the request that delivery is desired in several lots, a permit will be issued to cover each delivery. The terms "Net Dry Pounds" and "Total Net D. R. C." appearing on the face and the reverse side of the permit refer to Total Solids Pounds.

16. In every case the distributer, after making delivery of the rubber provided for by the permit, will execute the Distributer's Certificate on the reverse side thereof, and immediately return the original of the permit to Rubber Reserve Co. The duplicate copy may be retained by the distributer for its files. The triplicate copy is for the manufacturer's records.

17. In order to maintain the desired control over stocks, it will be necessary for manufacturers who are both distributers and consumers of Normal or Concentrated Latex, Deproteinized Rubber and Sprayed Rubber to apply to this office for a permit covering their own consumption requirements in the same manner as if a purchase were being made from another distributer. A form of affidavit, designated as Exhibit "C," is attached hereto for use in cases of this nature.

18. It is possible that some distributer occasionally will not have sufficient stocks of Normal or Concentrated Latex, Deproteinized Rubber and Sprayed Rubber available to take care of permits issued to its established customers, and in such instances, another distributer with available stocks will be required to fill the permits, although the manufacturer in question may not be one of its regular customers.

19. A sample copy of the permit for the purchase of Normal or Concentrated Latex, Deproteinized Rubber and Sprayed Rubber is attached hereto for informative purposes only, and should not, in any case, be filled out by a manufacturer, since all permits are issued from this office.

Purchase of Normal or Concentrated Latex, Deproteinized Rubber and Sprayed Rubber from Manufacturers

20. Upon receipt of an appropriate request, Rubber Reserve Co. will arrange for the purchase from manufacturers of surplus stocks of Normal or Concentrated Latex, Deproteinized Rubber and Sprayed Rubber.

21. Requests of this nature should state clearly the type or types involved, the quantity of each type or types in U. S. Gallons and net dry pounds, the percentage of concentration, the location thereof, the actual purchase price of the commodity, plus freight, insurance and charges incurred, if any, for storage in commercial warehouses, and the name of the distributer from whom the latex was originally purchased.

22. Arrangements will also be made for the purchase of surplus stocks of compounded latex upon receipt of full information in connection therewith.

Inventories

Paragraph (h) of Amendment No. 3 to Supplementary Order No. M-15-b, issued by the Priorities Division of the Office of Production Management, reads as follows:

> *Limitation of inventories*
>
> No Person shall receive delivery of Rubber or Latex, or products thereof, in the form of raw materials, semi-processed materials, finished parts or sub-assemblies, in quantities which shall result in an inventory of such material in excess of a minimum practicable working Inventory, taking into consideration the limitations placed upon the production of Rubber or Latex products by this Order.

In the opinion of the Rubber and Rubber Products Branch of the Office of Production Management and Rubber Reserve Co., a 60 days' supply of Rubber or Latex constitutes a practicable working inventory. For this reason, attention is particularly called to the statement contained in the affidavits (Exhibits "A" and "B") with respect to inventories.

In connection with crude rubber, however, it is possible that while a manufacturer's total inventory may represent more than a 60 days' supply, certain grades of rubber, not represented in such inventory, are needed to meet processing requirements. In cases of this nature, if other grades cannot be substituted, Rubber Reserve Co. will give consideration to the issuance of a permit to purchase additional rubber, but the request should be accompanied by a letter fully explaining the situation.

The Procedure Outlined in This Circular Will Become Effective on February 1, 1942

Issued January 31, 1942.

EXHIBIT "A"

AFFIDAVIT

I, ... (Name) do hereby certify that I am ..... (Title or Position) of ..... (Name of Manufacturer); that said manufacturer will require ..... tons of rubber (in addition to inventories of ..... tons of rubber now on hand) during the period from ....., 194.. to ....., 194.. for the manufacture of products in the manufacture of which rubber may be used under the provisions of Supplementary Order No. M-15-b, as amended, issued by the Office of Production Management or other official instructions of the Office of Production Management; that such rubber, together with inventories of rubber now on hand, is to be used for the manufacture of such products and for no other purpose; that the amount of rubber which said manufacturer will use, consume or process during such period will not exceed the limitations upon the use, consumption or processing of rubber imposed by said Supplementary Order No. M-15-b, as amended, and any other instructions issued by the Office of Production Management. I further certify that, at the end of the period referred to above, total stocks on hand will not be in excess of a practicable sixty-day working inventory.

.....
(Signature)

Subscribed and sworn to before me this ..... day of ..... 194..

.....
(Notary Public)

EXHIBIT "B"

AFFIDAVIT

I, ... (Name) do hereby certify that I am ..... (Title or Position) of ..... (Name of Manufacturer); that said manufacturer will require ..... (State quantity in U. S. Gallons and net dry pounds, and percentage of concentration) ....., (in addition to inventories of ..... tons of rubber now on hand) during the period from ....., 194.. to ....., 194.. for the manufacture of products in the manufacture of which rubber may be used under the provisions of Supplementary Order No. M-15-b, as amended, issued by the Office of Production Management or other official instructions of the Office of Production Management; that such rubber, together with inventories of rubber now on hand, is to be used for the manufacture of such products and for no other purpose; that the amount of rubber which said manufacturer will use, consume or process during such period will not exceed the limitations upon the use, consumption or processing of rubber imposed by said Supplementary Order No. M-15-b, as amended, and any other instructions issued by the Office of Production Management. I further certify that, at the end of the period referred to above, total stocks on hand will not be in excess of a practicable sixty-day working inventory.

.....
(Signature)

Subscribed and sworn to before me this ..... day of ..... 194..

.....
(Notary Public)

EXHIBIT "C"

AFFIDAVIT

I, ... (Name) do hereby certify that I am ..... (Title or Position) of ..... (Name of Manufacturer); that said manufacturer will require ..... (State quantity in U. S. Gallons and ..... during net dry pounds, and percentage of concentration) the period from ....., 194.. to ....., 194.. for the manufacture of products in the manufacture of which rubber may be used under the provisions of Supplementary Order No. M-15-b, as amended, issued by the Office of Production Management or other official instructions of the Office of Production Management; that such rubber, together with inventories of rubber now on hand, is to be used for the manufacture of

such products and for no other purpose; that the amount of rubber which said manufacturer will use, consume or process during such period will not exceed the limitations upon the use, consumption or processing of rubber imposed by said Supplementary Order No. M-15-b, as amended, and any other instructions issued by the Office of Production Management.

.....
(Signature)
Subscribed and sworn to before me this ..... day of ..... 194..
.....
(Notary Public)

Circular No. 4 on Additional Instructions with Respect to the Sale and Purchase of Crude Rubber, Latex, Deproteinized Rubber and Sprayed Rubber

(Modifying Circular No. 3)

1. Amendment No. 3 to Supplementary Order No. M-15-b, issued by the Priorities Division of the Office of Production Management on January 23, 1942, and Circular No. 3, dated January 31, 1942, issued by this Company pursuant to said Amendment No. 3, prohibit the delivery of Crude Rubber, Latex, Deproteinized Rubber and Sprayed Rubber in the performance of executory contracts in effect at the close of January 23, 1942. In view of the fact that the prohibition of all such deliveries would result, in many cases, in undue hardship, this Company, with the approval of the Rubber and Rubber Products Branch of the War Production Board, has decided to remove, and does hereby remove, the aforesaid prohibition, the objective sought being to permit all such contracts to be performed in accordance with their terms provided only, however, that prior to any such delivery (a) the person to whom delivery is to be made shall have first obtained an appropriate permit from this Company in the manner set forth in Circular No. 3 and in the pertinent provisions of Circular No. 1 which were incorporated by reference into Circular No. 3, and (b) all of the procedure with respect to permits is followed as therein set forth.

2. The schedule of prices set forth in Paragraph 11 of Circular No. 3, dated January 31, 1942, is hereby amended, and the prices listed therein for the sale of normal and concentrated latex, deproteinized rubber and sprayed rubber are, until further notice, reduced by three cents ($0.03) per pound.

3. Paragraphs 3, 7, and 20 of Circular No. 3, dated January 31, 1942, which relate to the purchase by Rubber Reserve Co. of surplus stocks of rubber and latex from dealers and manufacturers are amended to provide that requests for the purchase of such stocks must be forwarded to Rubber Reserve Co. not later than March 15, 1942.

4. Amendment No. 3 to Supplementary Order No. M-15-b, issued by the Priorities Division of the Office of Production Management under date of January 23, 1942, provides that manufacturers who make cement to be used in the manufacture of new shoes are permitted to consume during any calendar month, beginning with February, 1942, not more than 70% of their average monthly consumption of latex in producing the same product during the twelve months' period commencing April 1, 1940, and ending March 31, 1941. In view of the foregoing, Rubber Reserve Co., upon receipt of a request, accompanied by an appropriate affidavit, will issue permits to manufacturers for the purchase of latex to be used in the manufacture of cement. Issued February 17, 1942.

Circular No. 5 on Purchase Permits

1. In submitting requests to Rubber Reserve Co. for the issuance of permits covering the purchase of crude rubber, manufacturers should state clearly the type and grade of rubber desired, by R. M. A. classifications, and in addition thereto, indicate an alternate type and grade which will be acceptable in the event that the requested type and grade cannot be supplied.

2. Affidavits submitted with requests for permits authorizing the purchase of normal or concentrated latex must state the number of U. S. gallons, the dry solids pounds, and the per cent. of concentration.

3. In a large number of instances, manufacturers have not taken delivery of the crude rubber covered by a purchase permit during the delivery month specified in the permit, and in some instances, delivery has been delayed for several months. Effective April 1, 1942, all permits issued by Rubber Reserve Co. covering the purchase of crude rubber must be presented to D. D. Haldane, Distributing Agent, 15 William St., New York City, within 30 days from the date of the permit and delivery of the rubber covered by such permit must be taken within 30 days thereafter. All purchase permits not completed by delivery within 60 days from the date of issuance thereof will be automatically cancelled.

4. Despite instructions which have been previously forwarded from this office, some manufacturers do not submit the affidavit required under the provision of our Circular No. 3 at the time a purchase permit is requested, thereby delaying the issuance of the permit. A separate affidavit must be submitted in connection with each request, and separate requests and affidavits must be submitted for deliveries required during each calendar month.

5. As has been previously pointed out, Rubber Reserve Co. cannot issue purchase permits to any manufacturer until such manufacturer has complied with the requirements of the Rubber and Rubber Products Branch of the War Production Board with respect to the execution and delivery to such office of certain forms relating to the manufacturers' activities. If this requirement has not been complied with by all manufacturers, it should receive immediate attention; otherwise the issuance of permits will be delayed.

6. All requests for purchase permits must be forwarded to the Sales Department of Rubber Reserve Co. at least 30 days in advance of the date on which delivery is desired. Due to the large volume of permits now being issued daily, we cannot guarantee prompt deliveries unless the manufacturer complies with this requirement. Issued April 1, 1942.

Additional Rubber Orders

(*Continued from page* 361)

(Lend-Lease Act).

(4) Such purchase is made by a dealer in Life Saving Suits for the purpose of resale.

(d) *Records.* All Persons affected by this Order shall keep and preserve for not less than two years accurate and complete records concerning inventories, sales and products.

(e) *Reports.* All Persons affected by this Order shall execute and file with the War Production Board such reports and questionnaires as may be required by said Board from time to time.

(f) *Communications.* All reports required to be filed hereunder and all communications concerning this Order shall, unless otherwise directed, be addressed to

"War Production Board
Washington, D. C. Ref: M-15-e"

(g) *Violations.* Any Person who wilfully violates any provision of this Order, or who, in connection with this Order, wilfully conceals a material fact or furnishes false information to any department or agency of the United States is guilty of a crime, and upon conviction may be punished by fine or imprisonment. In addition, any such Person may be prohibited from making or obtaining further deliveries of, or from processing or using, material under priority control and may be deprived of priorities assistance.

(h) *Applicability of Priorities Regulation No. 1.* This Order and all transactions affected thereby are subject to the provisions of Priorities Regulation No. 1 as amended from time to time, except to the extent that any provision of this Order may be inconsistent therewith, in which case such provision shall govern.

(i) *Effective Date.* This Order shall take effect upon the date of its issuance. Issued this 1st day of June, 1942.

J. S. KNOWLSON

EDITORIALS

Compounding and Conservation

A METHOD of rubber conservation which has not been given much emphasis to date, but is now being given consideration by the government rubber bureaus is the increased use of reenforcing fillers, particularly in tire compounding. This method has been used in the past when the price of rubber was two or three times what it is today. Dilution of rubber with more true reenforcing fillers will detract very little from the quality of the finished product and, what is of much greater importance, will extend the use of our present and future resources of rubber over a much longer period.

It is unfortunate that with the products consuming a major portion of our rubber supplies (passenger, combat, and truck tires) we have not worked out any good correlation between the rubber content of the compound and service life of the finished product. Consequently the WPB, in order to insure the best usage of rubber and reclaimed rubber, designated the amounts that could be used in accordance with average percentage compositions found in use in the industry during recent years and within very narrow limits for various grades of compounds and for various products, but without any information as to what service might be expected except in a very general way. Even if a rubber manufacturer were able to develop a compound formula for any of the various grades listed that would show an appreciable saving of rubber, he is discouraged from so doing because of two things, governmental specifications and cost.

During the past several years since the early 1930's the price of crude rubber has been at a very low figure and only started to rise during 1939, '40, and '41 when improving business conditions and stockpiling of rubber for national defense resulted in new highs in demand. The price was finally fixed in August, 1941, by OPA, and the Rubber Reserve Co. was designated as the sole buyer and would make rubber available to rubber manufacturers at a price of 22½¢ a pound for No. 1X smoked sheets, with appropriate price differentials on other grades. The efforts of the rubber compounders and technologists during the 1930's were to develop greater and greater quality in rubber products with liberal use of crude rubber because of its low price. But now it is necessary to use every pound of rubber to the best advantage, and the use of a greater amount of reenforcing fillers is one of the ways that should be used to the limit in doing it.

Adjustment of governmental minimum rubber content specifications should be made to permit greater conservation of our rubber supplies. Yet still another factor must be adjusted, and that is the present ceiling price of crude rubber. The ceiling price on synthetic rubber was recently removed to permit adjustments during the period of industrial expansion that this industry is about to enter upon. This is natural in view of uncertainty of costs. But why keep the price of crude rubber at a point equivalent with its easy availability when every pound is almost worth its weight in gold? The best way to be sure that crude rubber is used with the care that its present position warrants is to give it a value in dollars and cents that is somewhere near its value in relation to supply and demand. It may be argued that this move would encourage rising prices and higher costs for rubber products. Yet which is the lesser of two evils for the war period: increased cost of rubber products, or the exhaustion of our rubber supplies earlier than might be necessary? The fixing of prices on materials and products of which there are only limited actual shortages is logical, but the setting of prices at the pre-shortage levels of materials in which severe shortages exist will not provide the proper emphasis on their value. To permit the violent upward surge of the price of rubber which would result from the removal of all price restrictions is not advocated, but the fixing of the price at a level more nearly consistent with its real value under present conditions certainly is. With a higher priced rubber the development of compounds containing reduced amounts of crude rubber without any great sacrifices of quality and service life will be encouraged.

What is needed is a program of evaluation of rubber products essential to the war effort, particularly passenger, combat, and truck tires in terms of reduced crude rubber and increased filler content. Such a program should be carried out by the companies now making these products in conjunction with the military and essential civilian transport users with the coordinative supervision of Mr. Newhall and Mr. Nelson. The results of the work should mean a valuable extension of the time that our present and future supplies of crude rubber will be available for essential needs, should mean more time for developing synthetic rubber production, should extend our supplies of reclaimed rubber, and finally, and most important, strengthen and improve our military position on this essential strategic raw material, rubber.

National Scrap Rubber Drive

THE scrap rubber collection campaign seems certain of providing sufficient material to keep reclaimers operating at capacity two or three months. Because of the "historic" nature of the scrap turned in, however, it is doubtful if the high collection rate will continue. Reduced tire mileage along the Eastern Seaboard from gasoline rationing will lessen the flow of scrap rubber to reclaiming plants, nearly all in this section.

To maintain capacity reclaim production a good scrap collection rate will probably mean intensive development of previously unworked sources. More emphasis on collection of scrap from states unaffected by gasoline rationing and development of a well-organized system of collection from the military forces are two ways of providing increasing amounts.

New Goods and Specialties

"U. S. Ice Grip Tread"

Non-Skid Airplane Tire

THE "U. S. Ice Grip Tread", an airplane tire developed for positive traction and braking power on snow and glare ice, has relatively lightweight inserts of sharp cylindrical crimped steel distributed over a substantial area of the ground-contacting portion of the tread. In operation the inserts do not limit the movement of the tread rubber under load and touch the ground only at that portion of the tire under direct load. The portion of each insert exposed at the road engaging surface of the tread wears down quickly until it extends below the tread surface. Thereafter the rate of wear of the inserts is substantially that of the tread rubber. As a result of the wearing condition, the inserts do not contact the road surface upon the initial engagement of the tread, and hence, it is claimed by the manufacturer that no initial impact or objectionable noise occurs. United States Rubber Co., 1230 Sixth Ave., New York, N. Y.

Blackout Products

SAF-T-BLAK, applicable to windows for air-raid protection in blackouts, is a film, camouflage gray on the outside and white on the inside, which does not absorb heat as does blackout paint. Reportedly it decreases the danger of windows breaking because of excessive heat and prevents broken glass from flying.

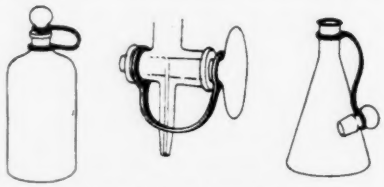
Saf-T-Glo is a luminous material for marking strategic points such as first-aid stations, raid shelters, etc. During blackouts it cannot be seen from the air, but gives off a glow easily visible from the ground. General Tire & Rubber Co., Akron, O.

Spring for Meat Car-Wheel Trucks

A RUBBER spring snubbing unit that acts as a supplement to the steel springs of the wheel trucks of freight cars has been designed to prevent the transmission of vibration. Previously wheel vibrations at certain speeds caused dressed quarters of beef to tear loose from refrigerator car hooks, and cars arrived at markets with many bruised and damaged pieces on the floor. The rubber spring is reportedly specially compounded to resist weather, brine, and sulphur drip to which the trucks are exposed. The Goodyear Tire & Rubber Co.

Fasteners for Container Stoppers

TYONS are elastic and resilient rubber fasteners of practical laboratory convenience for attaching glass stoppers to flasks and bottles. They are made of sulphur-free, amber pure gum and are



A FEW OF MANY APPLICATIONS

reported to give long service without appreciable wear and to eliminate loss, mismatching, damage from dropping, and contamination by insertion in wrong containers. Tyons are available in sizes of two, three, and four inches in length and ¼-, 5/16- and ⅜-inch in diameter. Chemical Rubber Co.

Synthetic Industrial Adhesives

"FAIRPRENE" cements and caulking compound, which come in seven grades, are described as unvulcanized synthetic elastic compositions dispersed in a solvent which contains either the activating ingredients for vulcanization with heat, or are so formulated that vulcanization will take place at atmospheric temperatures after the addition, prior to use, of a solution of activating ingredients. The dispersing agent is coal-tar solvent naphtha, but benzol or toluol can be used or, when a non-inflammable solvent is required, carbon tetrachloride. Any of these solvents can be used for thinning if the solution is too thick for application.

"Fairprene" reportedly has greater resistance to oxidation and sunlight than rubber from comparable cements and is more resistant to permeation of hydrogen, helium, carbon dioxide, mustard, and other gases than rubber. Common alkalies appear to have no effect on "Fairprene", and it will withstand the action of 30 to 35% hydrochloric and sulphuric acids. It swells slightly in the lighter distillates such as gasoline, kerosene, and naphtha, but the swelling does not cause tendering of the film. Carbon tetrachloride and other non-inflammable dry cleaning agents have a swelling and softening effect. Natural gas and dry artificial gases have no effect, but the drip oil or condensate that collects in gas meters and pipe lines causes tendering and subsequent deterioration. "Fairprene" is resistant to the deteriorating action of crude petroleum oil and its products and is more resistant than rubber to animal, fish, and most vegetable oils. Alcohol has no effect, but lacquer solvents containing large amounts of butyl or amyl acetate, and aromatic hydrocarbons will cause softening of the film. Coal-tar solvents, it is claimed, cause less swelling of the film than on similar rubber cements. Turpentine causes tendering. "Fairprene" absorbs small amounts of water; however special compounds are available for use where low water absorption is of extreme importance.

The "Fairprene" compounds are reportedly useful to adhere various combinations of cured and uncured neoprene stocks, neoprene fabrics, rubber, and leather fabrics and paper. They may be employed in aluminum and aluminum alloy sheet metal joints prior to riveting in the fabrication of fuel tanks and watertight compartments. The cements are recommended by the manufacturer as binders for oil-resistant packings, sealants for instrument installation, protective coatings on wire, and impregnants for fabric and fiber compositions. E. I. du Pont de Nemours & Co., Inc., "Fabrikoid" Division, Fairfield, Conn.

Pressing on two small containers releases inflating gas in the pneumatic life belt. Pressure may be increased by blowing into two sections of hose attached to the preserver. Weighing about two pounds, it will reportedly support a man with full equipment for protracted periods. B. F. Goodrich Co.

The notable uniformity and balance of Micronex minimize the differences which appear when ordinary blacks are used.

A COLUMBIAN COLLOID

MICRONEX

Beads or Compressed

200 TONS OF SMOKE A DAY

BINNEY & SMITH CO. • COLUMBIAN CARBON CO.

DISTRIBUTOR MANUFACTURER

COLUMBIAN CARBON COMPANY

THE PIONEER *Semi-Reinforcing* RUBBER CARBON

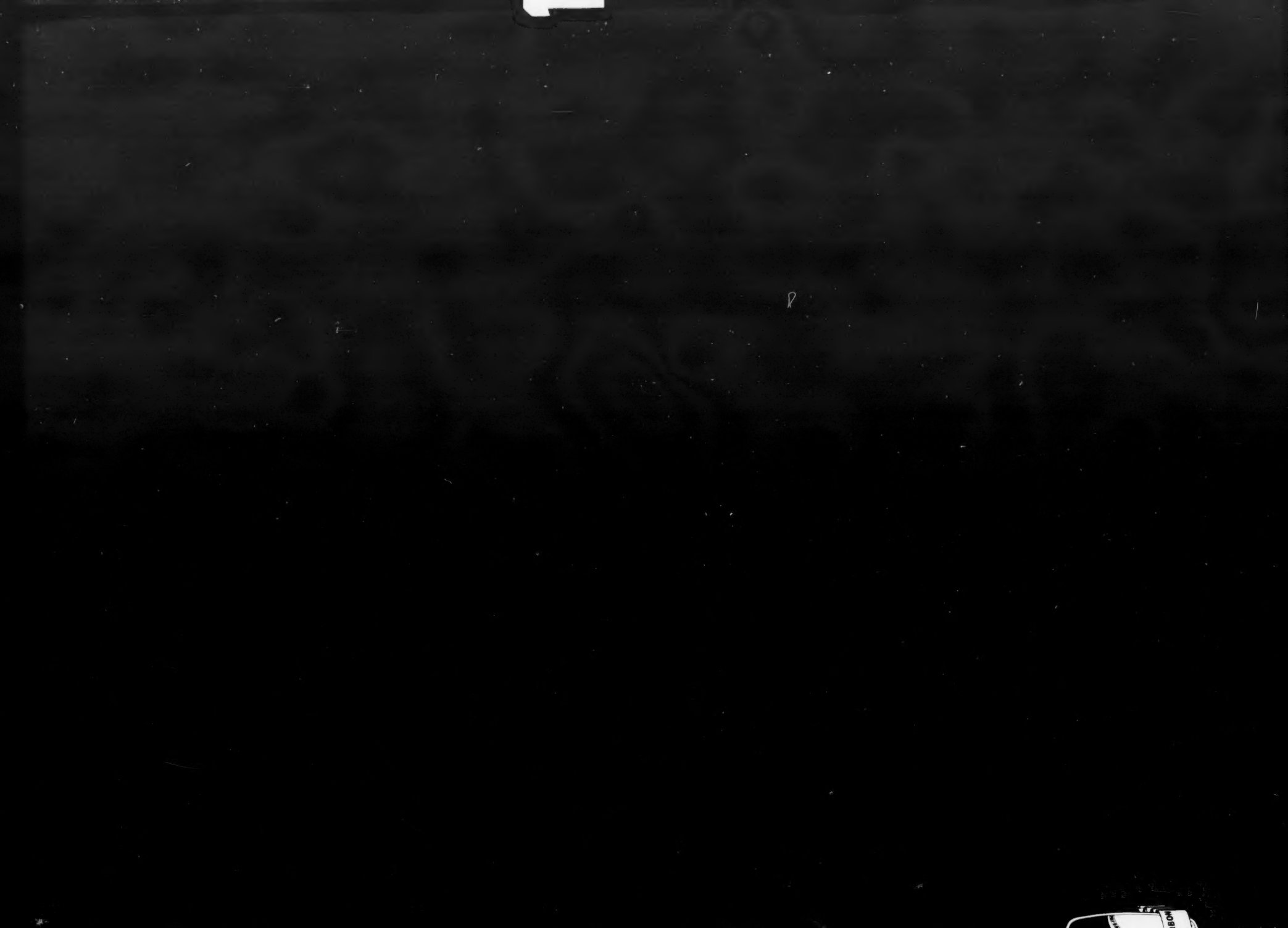
FURNEX

BEADS OR DENSE

A COLUMBIAN COLLOID

BINNEY & SMITH CO. • COLUMBIAN CARBON CO.

DISTRIBUTOR MANUFACTURER



What the Rubber Chemists Are Doing

A. C. S. Activities

Rubber Division Meets September 10

THE Division of Rubber Chemistry will convene September 10 and 11 in conjunction with the American Chemical Society convention in Buffalo, N. Y., September 7 to 11. Rubber Division headquarters will be at the Hotel Lafayette. The banquet will be held the evening of September 10 at the Statler Hotel. All local arrangements are being made by the Buffalo Group, of which John S. Plumb, factory manager, U. S. Rubber Reclaiming Co., is chairman, and Howard L. Wiley, chief chemist, U. S. Rubber Reclaiming, is secretary-treasurer.

L. B. Sebrell has been named Charles Goodyear lecturer for 1942 by the committee in charge of this award. His lecture, "The Second Mile", which concerns future research for improving synthetic rubber, will be presented at the Buffalo meeting.

A series of special papers concerned with the present vital problems of the rubber industry will include some dealing with various phases of the synthetic rubber program. In addition as many sessions as may be required will be devoted to papers of a general nature. Abstracts of 200-250 words of any paper to be presented at the meeting must be submitted in triplicate before July 10 to the divisional secretary, H. I. Cramer, Sharples Chemicals, Inc., 23rd and Westmoreland Sts., Philadelphia, Pa.

The following nominees for Division offices for the coming year have been submitted by a committee consisting of G. K. Hinshaw, chairman, R. H. Gerke, H. L. Trumbull, E. B. Curtis, and Ira Williams: chairman, J. T. Blake; vice chairman, Harold Gray, W. W. Vogt; secretary, H. I. Cramer; treasurer, C. W. Christensen; sergeant-at-arms, M. J. DeFrance, E. H. Nahm; directors, A. W. Carpenter, A. M. Neal, S. M. Cadwell, L. V. Cooper, J. M. Ball, and F. W. Frericks. A letter ballot will be sent to members about August 1.

George S. Haslam was appointed a director by the executive committee to complete the balance of the term of the late C. R. Park.

Los Angeles Group Meets

THE Los Angeles Group, Rubber Division, A. C. S., held its seventy-ninth meeting June 2 at the Mayfair Hotel, Los Angeles, Calif., with 113 members and guests attending. At the business session following dinner, Charles L. Fetzner (Monsanto) and Frederick Anderson (Imperial Paper & Color) were accepted as new members. George Steinbach (H. M. Royal Co.) was appointed chairman of the button committee to succeed G. L. Hillebert (L. H. Butcher Co.) who has joined the Army. A report on current events was given by John Hoeger (Schrader's).

The feature presentation of the program was by members of the "Training within Industry" group. William Hopkins, head of the organization, described the group's method to accelerate production, and Charles Fishburn demonstrated the round-table discussion technique as used in the plan. John B. Calhoun further detailed the training program. Films depicting the bombing of Pearl Harbor, the Japanese naval attack on Marshall and Gilbert islands, and the Russian winter offensive were shown by A. O. Coons.

A $25 war bond donated by the Braun Corp. was won by Mr. Fetzner. Ten dollar, $5 and $3.75 books of war stamps, donated by the rubber group, were won respectively by Robert F. Pfister (Goodyear), W. J. Vonder Reith (Sierra Rubber), and J. J. Wildman (Commercial Rubber). A Shaeffer pen and pencil set given by R. B. Olds (Olds Alloy Co.) was won by Herman Libkind (Western Insulated Wire), and a Remington Rand Foursome electric razor, given by Claud Vonder Reith (Sierra Rubber), was won by Charles Lamb, Sr. (West American Rubber). Table favors, distributed by Albert Pickard (Braun Corp.), were 25¢ war stamps.

A golf tournament for the Group was held June 6. The annual summer outing will take place on July 24 and 25 at the Uplifters' Club. The next technical meeting will be held in October.

Boston Holds Summer Meeting

THE Boston Group, Rubber Division, A. C. S., held a summer meeting, June 12, at the University Club, Boston, Mass., in place of the usual annual outing. A program of sports, utilizing the club's facilities, occupied the afternoon. Winners of events included: badminton, Harry Atwater (Hood), and J. H. Clarke (Hood); bowling, high three strings, Leo Collett (Davidson Rubber), and high single string, Kenneth Winkley (Hodgman); swimming, 25 yard free style, James Christopher (Titanium Pigment) plunge, Robert Cowan, relay, George Jatineu (Schulman), Kenneth Bolton (Titanium Pigment), James Christopher and Robert Cowan.

After the dinner, attended by 175 members and guests, A. B. Hoel, technical representative of the processing oil division, Sun Oil Co., presented a technical paper, "Some Aspects of Petroleum Refining in the Year 1942." Carveth Wells addressed the group on "The Battle of Tin and Rubber" and discussed the problems of the United Nations with respect to strategic materials. Motion pictures taken in Malayan jungles were shown.

Contest and attendance awards were contributed by the following firms: L. Albert & Son, American Cyanamid & Chemical Corp., American Resinous Chemicals Corp., American Zinc Sales Co., T. C. Ashley & Co., J. T. Baker Chemical Co., Carter Bell Mfg. Co., Binney & Smith Co., Stewart Bolling & Co., Inc., Boston Woven Hose & Rubber Co., Brockton Machine Co., Godfrey L. Cabot, Inc., D. R. Campbell Machine Co., Cleveland Liner & Mfg. Co., Continental Carbon Co., Converse Rubber Co., James Cunningham, James B. Cunningham Co., Dicalite Co., E. I. du Pont de Nemours & Co., Inc., Wm. D. Egleston Co., Eustis, Pennock & Co., H. T. Feinberg & Sons, Inc., C. E. Gale Co., General Atlas Carbon Division, General Electric Co., Hird & Conner, Inc., Hodgman Rubber Co., Hood Rubber Co., J. M. Huber, Inc., Ralph Huber Co., Hycar Chemical Co., Imperial Paper & Color Corp., Innis-Speiden & Co., Ernest Jacoby & Co., Krebs Pigment & Color Corp., D. H. Litter Co., Inc., Mallinckrodt Chemical Works, Malrex Chemical Co., Monsanto Chemical Co., H. Muehlstein & Co., Inc., Naugatuck Chemical Division, New Jersey Zinc Co., Niagara Sprayer Co., A. C. Nispel, Inc., Panther-Panco Rubber Co., Phillip Bros., Inc., Plymouth Rubber Co., Inc., *The Rubber Age*, Sanford Mills, A. Schrader's Son Division, A. Schulman, Inc., Henry L. Scott Co., Simplex Wire & Cable Co., Stamford Rubber Supply Co., Stanco Distributors, Inc., Thiokol Corp., Wm. R. Thropp & Sons Co., Titanium Pigment Corp., Turner Halsey Co., Tyer Rubber Co., United Carbon Co., R. T. Vanderbilt Co., Inc., Vansul, Inc., Weller Chemical Co., L. G. Whittemore, Inc., Charles T. Wilson Co., Wishnick-Tumpeer, Inc., Xylos Rubber Co.

Akron Group Holds Outing

THE Akron Group, Rubber Division, A. C. S., held its annual summer outing June 19 at the Fairlawn Country Club, Akron, O., with about 600 members and guests attending. E. H. Nahm (Naugatuck) was general chairman of the event. The finance and publicity committees were headed by E. W. Ballard (Midwest Rubber Reclaiming) and Glen Harry (Goodyear Aircraft), respectively. Entertainment was in charge of Lester Brock (Continental Carbon). Raymond Taylor (Firestone) was chairman of the all-day golf program, in which 169 members played. Golfing awards follow: a golf bag for the longest drive, to Francis Boling (Goodrich); one dozen golf balls for closest to pin, F. A. Martin (Hoover Co.); rain jacket for most balls out of bounds, C. E. McLaughlin (Goodyear); and a rain jacket for the shortest drive, D. H. Smith (Castle Rubber).

Dinner was served to 499 members and guests under the direction of a committee headed by E. H. Baker (Binney & Smith). Prize solicitation was in charge of W. J. Krantz (Goodyear), and the prize awards committee chairman was C. B. Moore (Philadelphia Rubber Works). The distribution of a large number of prizes was made possible through the generosity of the following firms:

Akron Chemical Co.; Akron Paint & Varnish Co.; Akron Standard Mold Co.; L. Albert & Son; American Cyanamid & Chemical Corp.; American Zinc Sales Co.; Anaconda Copper Mining Co.; J. T. Baker Chemical Co.; Barnsdall Oil Co.; Barium Reduction Corp.; Barrett Division, Allied Chemical & Dye Corp.; Binney & Smith Co.; Bridgeport Brass Co.; Bridgewater Machine Co.; Godfrey L. Cabot, Inc.; Cannon Mills, Inc.; Carbide & Carbon Chemicals Corp.; Central Rubber Reclaiming Co.; Columbia Chemical Co., Inc.; Continental Rubber Co. of New York; Dill Mfg. Co.; Dow Chemical Co.; E. I. du Pont de Nemours & Co., Inc.; Eastern Magnesia Talc Co., Inc.; English Mica Co., Inc.; Erie Railroad; Russell Farley & Co.; Farrel-Birmingham Co., Inc.; Firestone Tire & Rubber Co.; John Gammeter; General Atlas Carbon Division, General Properties Co., Inc.; General Magnesite & Magnesia Co.; B. F. Goodrich Co.; Goodrich Silvertown Stores; Goodyear Tire & Rubber Co., Inc.; Grasselli Division of du Pont; C. P. Hall Co.; Herron & Meyer; J. M. Huber, Inc.; Hycar Chemical Co.; Imperial Gas & Oil Co.; INDIA RUBBER WORLD; International Pulp Co.; Johnson Rubber Co.;

Manufacturers Rubber & Supply Co.; C. F. Marshall Co.; McNeil Boiler Co.; F. F. Meyers; Midwest Rubber Reclaiming Co.; Monsanto Chemical Co.; H. Muehlstein & Co., Inc.; National Rubber Machinery Co.; National Standard Co.; Naugatuck Chemical Division, United States Rubber Co.; New Jersey Zinc Co.; Niagara Sprayer & Chemical Co., Inc.; Ohio Mineral Spirits Co.; Ohio Rubber Co.; Ohio Sherardizing Co.; Ozark Mining & Smelting Co.; Philadelphia Rubber Works; Piqua Stone Products Co.; Pittsburgh Plate Glass Co.; Republic Rubber Co.; Rex Hide, Inc.; Rohner Paper Co.; *Rubber Age*; A. Schrader's Son; A. Schulman, Inc.; Seiberling Latex Products Co.; Seiberling Rubber Co.; Sharples Chemicals, Inc.; Shell Oil Co.; V. L. Smithers; Southern Acid & Sulphur Co., Inc.; Stamford Rubber Supply Co.; Standard Chemical Co.; Standard Oil Co. of N. J.; Stauffer Chemical Co.; Sun Oil Co.; Superior Zinc Corp.; Synthetic Products Co., Thiokol Corp.; Thompson, Weinman & Co.; Thomson & Kennon; Titanium Pigment Corp.; Turner Halsey Co.; United Carbon Co., Inc.; R. T. Vanderbilt Co., Inc.; C. K. Williams Co.; Charles T. Wilson Co.; Wishnick-Tumpeer, Inc.; Xylos Rubber Co.; St. Joseph Lead Co.

Plasticizers and Waxes

PLASTICIZER S-125, a product of Glyco Products Co., Inc., 230 King St., Brooklyn, N. Y., has recently been developed as an economical and effective substitute for dibutyl phthalate and similar synthetic rubber plasticizers. Used in amounts of 5% to 10%, it reportedly gives a flexibility to cured stock equal to that imparted by 20 to 30% dibutyl phthalate, and does not exude from the stock. In these amounts it is said to have definite lubricating tendencies which facilitate release from the mold. The plasticizer is insoluble in mineral and vegetable oils, thus giving added resistance to greases and oils in synthetic rubber hose, gaskets, packings, etc. A definite wetting tendency for pigments enables them to be milled in the stock quickly, easily, and also with a uniform dispersion.

Glaurin (sp. gr., 0.96 at 25°/25° C.) is a light yellow, oily liquid. As a plasticizer for rubber, it is non-drying, non-thickening, and practically non-volatile. It is completely soluble in alcohol and hydrocarbons, and though insoluble in water, it emulsifies readily on the addition of small amounts of alkali.

Synthetic waxes produced by the company include Ozowax, a substitute for Ozokerite; Nipocer N, replacing Japan wax; and Rezo Wax B, a substitute for montan wax. Hydrowax N, an emulsion of hard carnauba wax, gives a transparent, durable, and water-repellent film to the surfaces of rubber and other materials. Because of its hard wax content it must be carefully applied. Albacer is a new wax which may be substituted for carnauba wax where a non-aqueous solvent is employed.

Synthetic Fatty Acid

MYRISTILENE, a product of the Beacon Co., 89 Bickford St., Boston, Mass., is a synthetic fatty acid with a wide variety of suggested uses including that of a rubber softener and wetting agent. The iodine number is 40.3; the saponification number, 204; and the titre, 40°.

Midgley Discusses Chemistry of Rubber

THE Willard Gibbs Medal was presented to Thomas Midgley, Jr., vice president of the Ethyl Gasoline Corp., at a meeting of the Chicago Section, A. C. S., May 22 at the Stevens Hotel, Chicago, Ill. Dr. Midgley addressed the group on "A Critical Examination of Some Concepts in Rubber Chemistry."

Dr. Midgley posed seven questions dealing with the fundamental chemistry and physics of rubber, which he claimed cannot be satisfactorily answered although scientists and technologists have been studying rubber for more than a hundred years. Three of his questions were described as being of technical interest: What happens when rubber is broken down? What happens in vulcanization? Why does rubber retract or shrink after being stretched? His other four unanswered questions are primarily of scientific interest, but their answers, if found, might have important bearing on the technology of rubber: Are all molecules of sol rubber occurring in nature of the same size or is sol rubber a mixture of molecules of different sizes? If the molecules are all of the same size, what is their molecular weight? What is the structural formula of rubber; that is, how are the atoms assembled that make up its molecules? If rubber molecules are open chains of atoms, what are the groups of atoms at their ends?

The medalist also considered the chemistry of vulcanization from the points of view of two opposed concepts: (1) reversed breakdown, and (2) reduction of the slipping past each other of molecules under stress. The first theory assumes that rubber is elastic with fair tensile strength because its molecules are short, and Dr. Midgley suggested that if breakdown is the result of molecular rupture, the logical conclusion is that vulcanization must be molecular building up by polymerization or condensation. This concept explains the action of sulphur which is to connect two rubber molecules by joining to each of them by primary valences. However, he declared, there was no sound evidence to support this theory since incipient and then progressive vulcanization do not show the regular steps of increasing viscosity and decreasing solubility that would be expected, nor can a vulcanizate be obtained that shows quantitative properties corresponding to those of unmasticated rubber.

The second concept does not require the rebuilding of large molecules from small ones to account for vulcanization, Dr. Midgley pointed out. Any procedure such as the loading effect of zinc oxide or carbon black which results in reduced slipping of the molecules will accomplish such a change. This concept assumes the creation of intermolecular attraction during vulcanization. Sulphur bridging between the molecules will prevent slipping, but it can also be stopped by creating polar groups or secondary valences which will cause association. The difference between the two concepts is one of attraction by primary valences and attraction by association forces.

In discussing retraction and shrinking, Dr. Midgley stated that opinion began taking shape about 20 years ago that the rubber molecule itself might be assumed to be subject to extension and to exhibit forceful retraction thereafter.

While no direct evidence exists to confirm this concept, no contradictory evidence has been found, and upon this concept a generalized theory of molecular behavior has been developed.

Two explanations for the retraction of the rubber molecule were cited by Dr. Midgley. Sheckiock and others based one on thermal and thermodynamic considerations. Mack's theory makes use of van der Waal's forces applied to scale models. This theory, he concluded, predicts the behavior of rubber-like and related substances of known composition, structure, and isomerism. Its extension might be useful to predict new molecular forms that would lead to better and cheaper synthetic rubbers than are now made.

Cramer Addresses Canadian Chemical Groups

THE Chemical Silver Anniversary meeting was held June 1 and 2 at McMaster University, Hamilton, Ont., Canada, under the auspices of the Canadian Chemical Association, the Canadian Institute of Chemistry, and the Canadian Section, Society of Chemical Industry. At the general session, June 2, H. I. Cramer, Sharples Chemicals, Inc., Philadelphia, Pa., predicted a bright future for the synthetic rubber industry in the post-war period providing the war lasted two years.

"The synthetic industry will emerge firmly established," he said. "With all but 10% of the world's productive capacity of natural rubber in the hands of the Axis powers, the United Nations are being forced to develop, in the shortest possible time, large-scale plants capable of producing a high quality synthetic rubber." Dr. Cramer also considered crude and synthetic rubber supplies in relation to the war effort.

Sweeping Compound for Oil Spillage

A GREASE BALL ASBESTOS SWEEPING COMPOUND, which contains no acids or caustics and will not cause erosion, is claimed to eliminate fire and accident hazards caused by oil and grease accumulations. The compound is applied by sprinkling on the deposit, but heavy grease may first require soaking with kerosene. Scrubbing with a broom causes absorption of the oil and grease which can then be swept away. The compound can be re-used until thoroughly saturated. It is recommended by the manufacturer for removal of any oil or grease spillage. Philip Carey Mfg. Co., Dept. 114, Cincinnati, O.

UNITED STATES

RFC Controls All Rubber Imports; Deputy Rubber Coordinator Named

RFC subsidiaries have been designated sole importers of rubber, latex, reclaim, scrap, and balata, and products thereof in Amendment No. 10 to Order No. M-15-b. (See pages 361, 374.)

Alden C. Brett, of Hood Rubber Co., has been made deputy coordinator for rubber. (See page 374.)

Additional restrictions on the use of rubber are covered in several new orders and amendments: Amendment No. 6 to Order No. M-15-b-1 (see pages 361, 374); Amendment No. 3 to Order No. M-124 (see pages 361, 374); Supplementary Order No. M-15-e to Restrict Transactions in Rubber Life Saving Suits (see pages 361, 374); Conservation Order No. M-174—Elastic Thread (see page 374).

The government is continuing its investigation of the rubber situation. Hearings were held last month both in the House and in the Senate on reclaim and synthetic production. (See below.)

As we went to press, word came that new and additional consumers' ceilings prices on rubber scrap were issued by the OPA. (See page 404). It has also been indicated that on and after an effective date in the near future the Rubber Reserve Co. will be the sole buying agency of scrap rubber. The scrap will be purchased at 6c a pound for inner tubes, $25 a ton for tires, and $25 a ton for mixed scrap by the Rubber Reserve Co. through H. Muehlstein & Co., Inc., A. Schulman, Inc., Nat E. Berzen, Inc., and the Lowenthal Co., acting as agents. The scrap rubber will be allocated to reclaimers by Rubber Reserve Co. at the direction of the WPB.

CALENDAR

July 24-25.	Los Angeles Rubber Group. Summer Outing Uplifters Club.
Sept. 10-11.	A. C. S. Rubber Division. Hotel Lafayette, Buffalo, N. Y.
Oct. 5-9.	N.S.C. Thirty-first National Safety Congress. Stevens Hotel, Chicago, Ill.
Oct. 12-14.	A.S.M.E. Fall Meeting. Rochester, N. Y.
Nov. 9-13.	American Petroleum Institute. Annual Meeting. Stevens Hotel, Chicago.
Nov. 16-18.	American Institute of Chemical Engineers. Annual Meeting. Netherlands Plaza, Cincinnati, Ohio.
Nov. 17-21.	National Chemical Exposition and National Industrial Chemical Conference. Stevens Hotel, Chicago.
Nov. 30-Dec. 4.	A.S.M.E. Annual Meeting. New York.
Nov. 30-Dec. 5.	Exposition of Power and Mechanical Engineering. Grand Central Palace, New York.

Senate Considers Alcohol Rubber Legislation

Hearings before the sub-committee, of the Senate Committee on Agriculture and Forestry, Investigating Uses of Farm Crops in Production of Alcohol and Synthetic Rubber (the Gillette Committee) culminated on June 18 in the introduction in the Senate of S. 2600 by Senator Guy M. Gillette (Iowa). The bill makes provision for an increased supply of synthetic rubber manufactured from alcohol made from agricultural and forest products. A companion bill was introduced in the House the same day by Representative Anton A. Johnson (Ill.). The Senate bill sets up a "rubber supply agency" headed by a "director of rubber supplies" who can have no other employment or financial interest other than his government position. The bill further provides that the director must make available a rubber supply sufficient to meet military and civilian needs; that he make available at the earliest possible time an adequate supply of alcohol from agricultural products to meet military and civilian needs; and that the director be empowered to make loans or advances for production of rubber or alcohol from grains. Other wide powers are given the director. The bill, whose sponsors claim has favorable chances for enactment, was approved June 24 by the Senate Agricultural Subcommittee.

Prior to the introduction of the Gillette Bill, members of the Senator's committee had urged legislation to permit of an agency sympathetic to full development of all possible rubber sources. The National Grange also demanded of Congress legislation providing for expansion of synthetic rubber production through use of surplus grains and suggested that alcohol distillation plants be erected in the grain belt.

On June 10, Rubber Coordinator Arthur B. Newhall told the committee that the program of the Rubber Reserve Co. calls for an annual production of 230,000 tons of rubber from alcohol. The output will be allocated among four government owned plants to be completed between September, 1942, and July, 1943. Although Mr. Newhall said after the hearing that he did not believe a rubber from grains process could compete with other methods of production or with the sale of crude, it was rumored that both the President and Vice President Wallace are favorably inclined to the possibility of producing rubber from grains and would like to have a certain amount of the total synthetic output allocated to that process.

Both Mr. Newhall and Donald Nelson, WPB Director, have contended that the disadvantage of alcohol butadiene for rubber is the necessity of its transportation to polymerization plants from Midwest distilleries. Among the exhibits of the Senate Agriculture and Forestry Committee reportedly is a photostat of an order by WPB, presumably at the request of the Rubber Reserve Co., for the construction of 250 tank cars for transportation of butadiene which the agriculture committee contends were ordered for shipment of butadiene made from petroleum.

Ellender Bill Hearings Continue

Extensive hearings were held on June 9 and successive days on S. 2560, introduced in the Senate, June 1, by Senator Allen J. Ellender (La.). Its companion bill (H.R. 7156) was introduced in the House of Representatives on the same day by Congressman Wright Patman for the House Small Business Committee. The object of the Ellender Bill is to provide tires for 20,000,000 civilian cars deemed necessary for the country to carry on its war production program and maintain a sound civilian economy. Under its provisions 3,500 tons of crude rubber and 85,000 tons of reclaimed rubber would be allocated each year for the retreading or recapping of 30,000,000 tires. The bill also requires periodic tire inspection of all automobiles and provides for the release of odd-size and sub-standard tires now frozen by OPA in the hands of dealers and manufacturers to furnish additional means of civilian transportation. The bill is the result of hearings on tire dealer and rebuilder problems held in March, 1942, by the Special Committee to Study and Survey Problems of Small Business Enterprises (Murray Committee).

Glenn L. Martin, aircraft manufacturer of Baltimore, Md., testified that the Martin plant was faced with the critical problem of curtailed transportation. The Ellender bill, he said, offered a prompt solution. J. Penfield Seiberling, president of the Seiberling Rubber Co., Akron, O., pointed out that the bill prevents price cutting, which under the present rationing system threatens the security of independent tire dealers and retreaders. John M. Whitehead, president of the Norwalk Tire & Rubber Co., Norwalk, Conn., exhibited a recapped tire which contained two ounces of crude and 4½ pounds of reclaim in the camelback. The tire would give 7,000 miles of service, he said. Mr. Whitehead also showed a 100% reclaim inner tube which had undergone a 30-day driving test. Several other witnesses recommended discontinuance of the freezing order on obsolete and sub-standard tires. The bill is reported to have the backing of many independent tire dealers and retreaders.

Under-Secretary of War Robert Patterson testified that the War Department was unequivocally opposed to the bill.

"The 1943 outlook for rubber is not clear at all," he said. "Until we turn the corner and the synthetic plants come in, the War Department is not in favor of releasing any

of our reserve supply to satisfy civilian demands."

Rubber needs of the Army and the Navy for the 21 months beginning April 1, 1942, are in excess of 800,000 tons, he declared. The amount includes Lend Lease requirements for truck tires. The program recommended by the War Department, Mr. Patterson stated, includes a drive to purchase all excess tires in the possession of car owners, elimination or curtailment of long-haul trucking where it competes with rail transportation, the limitation of automobile speeds, and also national gas rationing.

J. W. Bicknell, Rubber Reserve Co. adviser, told the Committee that current estimates of exports to the United States from Latin American countries were 10,000 to 15,000 tons in 1942, and 30,000 to 40,000 tons in 1943.

Reclaim Legislation Proposed

S. 2575, calling for investigation of the scrap and reclaim rubber situation, introduced in the Senate, June 4, by Senator E. C. Johnson (Colo.) was referred to a sub-committee of the Senate Committee on Banking and Currency. No hearings on the bill have been scheduled. Specifically it is a proposed amendment to the Price Control Act of 1942 and requires the Price Administrator to investigate the extent to which scrap rubber is being reclaimed and made available for use. Other portions of the bill require surveys of the amount of scrap in the United States; the extent of reclaiming facilities; the extent to which reclamation and utilization can be increased; and the amount of reclaimed rubber which can be made available for civilian use by an effective scrap collection and reclamation program. The bill further requires that public hearings be held in a state to ascertain availability of gasoline supplies, transportation facilities, and the necessity of conserving tires prior to gas rationing in the state.

Guayule Legislation

On June 16 the House of Representatives passed and sent to the Senate a $53,548,099 omnibus second deficiency bill which included $8,835,000 for expansion of guayule production. The Budget Bureau had asked Congress for $9,750,000 for the rental of land, planting, and cultivation of guayule, and the extension of nurseries to 500 acres.

Simpson Appointed Committee Counsel

Elliot E. Simpson, director of L. Drexsage Rubber Co., New York, N. Y., was named counsel June 8 to a sub-committee of the House Coinage, Weights and Measures Committee investigating the rubber situation. Mr. Simpson has previously testified (May 7 and 12) before the sub-committee as well as various other congressional committees concerned with the rubber crisis. Mr. Simpson charged among other things that four of the large rubber companies had gained control of the federal rubber program, virtually forcing out of existence about 600 smaller rubber manufacturers.

Jones on Reclaim and Synthetic Production

Jesse Jones told the House Interstate and Foreign Commerce Committee, May 27, that a new scrap collection program was in preparation that he hoped would produce 35,000 tons a month. The plan was later revealed in the Rubber Reserve Co. offer of June 4 to buy scrap at $25 a ton. Mr. Jones estimated the amount of scrap available in the country at between 800,000 and 1,000,000 tons.

Paul Cabot, chief of the salvage unit of the Bureau of Conservation of WPB, told the Committee it would take six months and one-half million dollars to survey the amount of scrap in the country, according to the Bureau of the Census. Mr. Cabot also stated that the Rubber Reclaimers Association, Inc., had reported 137,599 tons in the hands of reclaimers at the end of March and 40,000 tons in the hands of dealers.

Elliot Simpson followed Mr. Cabot before the Committee with the statement that "there is right now in the hands of Albert & Sons, largest second-hand machinery dealers in the country, the nucleus of 25 reclaim plants." He further declared that it would require only 90 days to install a plant at a cost of $100,000 for machinery and installation and a maximum cost of $400,000 overall. A plant of this size, he said, would produce between 20,000 and 30,000 tons a year.

Arthur W. Carpenter, formerly with The B. F. Goodrich Co., and now in the Bureau of Conservation, told the Committee that tires recapped with reclaim of good stock were capable of 8,000 to 10,000 miles of wear at speeds up to 40 miles per hour. Such tires, he said, would contain up to one pound of rubber.

The Committee has turned over to the National Bureau of Standards for mileage tests several sets of tires made by Mr. Simpson. Committee members are also testing some of the tires on their own cars; some tires have been driven up to 2,500 miles. The Bureau of Standards is testing them on station wagons under actual driving conditions.

In his appearance before the Committee, Jesse Jones was also questioned concerning the synthetic program, which he said, now called for 800,000 tons.

Regarding the grain alcohol program, he stated, "We will either increase the entire program enough to include 200,000 tons of butadiene made from alcohol or take that much out of the petroleum products."

Mr. Jones was closely questioned by Representative Charles A. Wolverton, of New Jersey, concerning the whole rubber program. But the Secretary of Commerce would not give definite answers to such questions as: What is your understanding of the national need for rubber at the present time? How much synthetic rubber is actually being produced? How much will be in production by July, 1942? What plants are in operation?

Asked if he thought the situation would be improved if a single agency were created to have entire charge of the production of rubber, Mr. Jones said he didn't think so because the program was well under way. To insistent questioning by Mr. Wolverton about the import situation, the RFC chairman said he didn't know how much rubber we are getting into the country at present, but would be glad to get the figures for the Committee.

Rubber Agreement with Costa Rica

Rubber Reserve Co., the Department of State, and the Board of Economic Warfare on June 16 signed an agreement with the Republic of Costa Rica, under the terms of which Rubber Reserve Co. will purchase, over the next five years, all rubber produced in Costa Rica which is not required for essential needs there.

While Costa Rica has in the past produced only a small amount of rubber, the country has considerable potential resources, both of wild and cultivated rubber. Rubber Reserve Co. acting with the Board of Economic Warfare will aid in the development of these resources and expend the necessary funds for that purpose.

The signing of the contract is another step in the program of the United States to assure to the united war effort the maximum effective use of the rubber produced in the western hemisphere. Agreements for the acquisition of local rubber production have now been concluded with Brazil, Peru, and Nicaragua, besides Costa Rica, and negotiations are proceeding with the other American rubber producing countries.

Survey Petroleum for Synthetic Rubber

Petroleum Directive No. 52 was issued June 24 by Harold L. Ickes, Petroleum Coordinator, directing the Petroleum Industry War Council and other industry committees to undertake a comprehensive nationwide survey to investigate the oil industry's ability to produce raw materials for synthetic rubber by utilizing present refinery equipment without impairing the production of other war needs.

Butadiene a Bottleneck

Akron rubber experts recently pointed out that bottlenecks retarding synthetic rubber production were a shortage of butadiene, the difficulty of obtaining special steel and other materials to build plants, and the length of time—eight to ten months—required to construct plants.

The Office of Civilian Defense announced May 29 development of a plastics substitute for rubber hose to be used on the stirrup pump designed by the WPB. Specifications for the hose will be made available to manufacturers within the near future, it is reported.

Thiokol Corp., Trenton, N. J., has let contracts for two brick additions and to make other alterations at its plant, at cost of $12,500.

Truman Committee Reports on Investigation of Rubber

The report of the Special Committee Investigating the National Defense Program (Truman Committee) pursuant to S. Res. 71 (77th Congress, 2d session), bluntly summarized the facts relating to the critical rubber situation and its causes and effects. Blame for the current crisis was distributed among the cartel arrangement of Standard Oil Co. of New Jersey[1] and I. G. Farbenindustrie, A.G., Frankfurt a.M., Germany; Jesse Jones,[2] Secretary of Commerce, for reducing the proposed 1941 synthetic program; British and Dutch crude rubber interests; and the unchecked 1941 rubber consumption of automobile manufacturers. The lack of a centralized authority to begin a synthetic rubber program and the failure to start a scrap rubber collection program were cited as additional factors.

The investigation covered five major subjects: supply and prospective needs; analysis of the stockpile at the beginning of 1942; the prospects of obtaining natural rubber from sources other than the Far East, and of obtaining synthetic rubber; an analysis of the current rubber program; and conservation, including the accumulation of scrap, rationing, and kindred topics. Begun March 5, the hearings were concluded April 7. The Committee will hold further hearings to check the progress of the synthetic program after it has proceeded sufficiently for the Committee to determine whether the planned production can be fulfilled.

The report stated a factor delaying quota increases by the International Rubber Regulations Committee was its fear that, if the emergency failed to materialize, excess rubber stocks in this country would enable the United States to control market prices. After quota increases had been conceded rubber shipments lagged. Great quantities of non-strategic cargoes utilized space that might have been devoted to rubber. Efforts to unload cargoes on the West Coast were not very successful, and only a small percentage of shipments were debarked there, cutting down the number of trips boats could make by reason of the longer voyage to East Coast ports.

There was no substantial increase in the Spring of 1941 in government stocks. Only 70,000 tons were received in the first six months. Increased consumption for non-defense purposes, principally automobiles, in 1941 culminated in the record high rate of over 900,000 tons per year during the second quarter of the year. Industry stocks dropped from 176,000 tons on January 1 to 120,000 tons at the end of June. A total of 1,008,000 tons was imported during the year, compared with 486,000 tons in 1939, but the OPM allowed 1941 consumption to reach a record high of 766,000 tons, notwithstanding the restrictions placed on automobile production during the second half of the year.

Some rubber was lost to other nations, particularly Japan, which was able to purchase it for as little as 1/16¢ per pound above the maximum price set by the Rubber Reserve Co. Other reasons set forth by the Committee for the failure to build a larger stockpile were insufficient conservation measures; many exceptions from consumption quotas fixed by the OPM; failure of the Rubber Reserve Co. to take over private contracts for imported rubber, which absorbed imports during the third quarter of 1941; and the failure to place complete authority and responsibility for both conservation and the stockpile accumulation in one agency. Choosing a peak year for automobile production as a base period for fixing quotas was also pointed out as a deterrent to conservation.

The report suggested that rubber specifications for military equipment was too high and criticized the Army and Navy for not effecting a greater reduction in their rubber requirements. More effective use of railroad equipment for freight and civilian transportation was recommended.

No appreciable increases in crude imports can be expected, and the estimates of rubber obtainable from Latin America are conceded by their makers to be optimistic, the Committee said. Plantation yields in sizable amounts cannot be counted upon until the 1950's.

Despite the fact that there is a large reservoir of scrap, to date no comprehensive plan for its collection has been outlined. Committee suggestions included a price sufficiently high to obtain scrap now held; a system to induce junk dealers to collect and sell scrap to the government rapidly, and the making of many products from scrap for the armed forces. The report emphasized that since the turnover of tires and tubes will be much less rapid than in the past, the available supply of scrap will not be greatly increased.

More than half the report was devoted to the synthetic rubber program. Summarizing the activities of the Standard Oil Co. of New Jersey with reference to Buna-S, it said, "It is quite clear that in effect the cartel arrangement with I. G. Farben plus the cartel philosophy which remained even after I. G. Farben stepped out of the picture, seriously impeded developments of Buna-S rubber."

The plans for plants for raw materials and rubber offered to the government by Standard were apprised as sound and "should have been followed, with, however, proper safeguards to prevent it from unduly exploiting the need for rubber for its own benefit." Standard was also criticized for failure to issue licenses for the manufacture of Butyl rubber. The shortage of butadiene may require a much larger production of Butyl rubber than the program now calls for, the Committee stated.

The rubber program had suffered from its inception from inefficiency and because it was administered by too many people, the report said, and stated that it will be further retarded if divided responsibility continues. It revealed that responsible and informed persons had testified that they did not have complete faith in the country's ability to produce the required amount of synthetic rubber in 1943.

Revised planning was indicated in the statement, "The Committee believes that we are approaching the limit of new plant construction and has privately been recommending to the War Production Board that the whole war program should be reviewed in the light of present knowledge of where, when, and how we will have to fight so that we can make the maximum use of our resources."

Frankly and bravely the Committee advised, "It is only fair to the American people to say that no reasonable assurance has been found anywhere that individuals will have rubber for private, as distinct from defense, uses within the next three years."

[1] See INDIA RUBBER WORLD, Apr. 1, 1942, pp. 58, 61; and May 1, pp. 158-159.
[2] *Ibid*, May 1, 1942, p. 160.

To Purchase 11,000 Yugoslav Tires

Defense Supplies Corp. is negotiating with the Yugoslav Minister, Constantin Fotitch, in Washington, D. C., for the purchase of 11,000 tires which were part of a cargo destined last spring for Yugoslavia, but which was forced to turn back to New York, N. Y. The cargo was recently seized by the Requisitioning and Inventory Branch of WPB. But OPA claimed the tires and froze them where they were stored in a New York warehouse.

Negotiations have been held up because Mr. Fotitch has asked for demurrage and storage charges in addition to the invoice value of the tires. WPB officials have offered to purchase the tires at their invoice value.

Synthetic Rubber from Hard Wood

A synthetic rubber made from hard wood was recently described to the House Interstate Commerce Committee by its inventor, James J. Earsheim, president of the J. & J. Chemical Co., Buffalo, N. Y. He said that he had developed the process in Europe several years ago and there had manufactured tires from the rubber produced. No natural rubber is necessary in the tire processing. Sulphur is used in the vulcanization and the synthetic, Mr. Earsheim claimed, can withstand a temperature 200 degrees higher than that to which natural hard rubber can be safely subjected. He estimated that a plant with a capacity of 500 tons every 24 hours would cost $250,000 and would require about six months to build.

The United States Department of Agriculture, Washington, D. C., has announced completion of the spring nursery planting for the guayule rubber project at Salinas, Calif. The sowing of 21,000 pounds of seed covered 520 acres of nursery beds. The planting is expected to provide enough seedling plants for about 50,000 acres of field plantations next winter. The Bureau of Agricultural Chemistry and Engineering is testing large quantities of rabbit brush collected by rangers on western national forests to determine rubber possibilities.

All Rubber Imports Restricted; Brett Deputy Rubber Coordinator

Additional WPB News

The WPB, on recommendation of the Board of Economic Warfare, on June 6 prohibited in Amendment No. 10 to Supplementary Order No. M-15-b the importation of rubber and rubber products, including balata, except by subsidiaries of the Reconstruction Finance Corp. "Imports," as here used, cover a release from the bonded custody of the United States Bureau of Customs as well as any shipment from a foreign country or from any territory or possession of the United States into continental United States.

The Rubber Reserve Co. of the RFC, which is the sole importer of crude rubber and latex, will now also undertake the purchasing of reclaimed and scrap rubber in any form as well as finished rubber products and balata. (See page 361.)

Almost 300 tons of crude rubber will be conserved for war production by Amendment No. 6 to Supplementary Order No. M-15-b-1, effective June 12, which requires the use of more reclaimed rubber and less crude in the manufacture of industrial pneumatic and solid tires. Thus, from 75 to 100 tons of crude rubber should be saved annually without materially diminishing quality. The tires affected are used on industrial trucks and similar equipment generally found in factories and shipyards.

The Amendment also establishes specifications for making rubber insulating tape, expected to save an additional 200 tons of crude a year. The regulations permit the manufacture of the insulating tape only from an unvulcanized or partially vulcanized compound of rubber and reclaimed rubber and set a maximum weight permitted for a specified length of tape. Use of latex in such tape is forbidden.

The use of bare rubber thread and of covered rubber thread of size 60 and coarser are prohibited in the manufacture of a list of health and medical products in Amendment No. 3 to Conservation Order No. M-124, released May 26. (See page 361.) Covered rubber thread, size 61 and finer, however, may continue to be used in such products. Bare rubber thread of any size now may be used only in the manufacture of products for military purposes.

Products affected by the new amendment are: edging, industrial shoes, belting and flexible metallic hose, repair cords and webs, sanitary belts, surgical elastic bandage, surgical stockings, trusses, webbing for respirators, hose masks, gas masks and inhalators, and surgical supports for abdomen, back, and breast. Rubber yarn, latex yarn, or elastic thread for use in these products were previously exempt from the restrictions of the order. Amendment 3 limits this exemption to covered rubber yarn, covered latex yarn, or covered elastic thread of size 61 or finer.

Supplementary Order No. M-15-e (see page 361), issued June 1, restricts the sale and purchase of rubber life-saving suits so that the necessary equipment may be available for ocean-going and coastwise cargo and tank vessels of more than 1,000 gross tons, to meet recent United States Coast Guard regulations requiring one such suit for each person on board. The Coast Guard will also regulate the distribution of these over-all watertight, buoyant garments, which require four to six pounds of rubber each. Other accepted sales are those expressly authorized by the Director of Industry Operations or for Army, Navy, Coast Guard, or Lend-Lease purposes.

Washington Press-Photo, Washington D. C.

Alden C. Brett

Supplementary Rubber Order No. M-15-d, to Restrict Transactions in New Aircraft Tires and Tubes, issued June 12, requires persons purchasing new airplane tires to secure a certificate from a safety regulation inspector of the CAA stating the necessity of the purchase. The buyer must also turn in the old tire which is to be replaced. Certain exemptions to the order likewise are listed.

The WPB in Conservation Order No. M-174, issued June 20 and effective June 24, limited the use of elastic fabric, whether knitted, woven, or braided, to essential health articles and to military products. Excepted is elastic fabric found by the WPB to be unsuitable or unnecessary in the production of the permitted articles.

Essential health articles for which elastic fabric may be used are the same as those listed in List B, Group 15, of Amendment No. 7 to Supplementary Order No. M-15-b. That Order makes rubber available for the listed articles. Order No. M-174 makes the elastic fabric available for the same list of articles. The list follows: industrial shoes, belting, and flexible metallic hose; repair cords and webs manufactured from rubber thread of the sizes permitted by Conservation Order No. M-124, or from scrap or tag ends of less than five feet in length; sanitary belts subject to Order L-137; surgical elastic bandages; surgical stockings; supports for abdomen, back, and breast, subject to Order No. L-90; trusses (including umbilical belts); webbing for respirators, hose masks, inhalators, and goggles; edging for baby pants. The restrictions of the new order do not apply to elastic fabric to be used for orders for the Army, Navy, Maritime Commission, War Shipping Administration, Panama Canal, Coast and Geodetic Survey, Coast Guard, Civil Aeronautics Authority, National Advisory Committee for Aeronautics, Office of Scientific Research and Development, or any Lend-Lease order.

In addition any elastic fabric which on June 20 had been packaged in the customary retail form also is exempt. However both the kind of packaging and the amount of the fabric must be different from the customary package used for distribution to processors, manufacturers, or any persons other than retailers or persons selling to retailers.

Under the order the unsuitable fabric may be used, at a considerably reduced rate per unit, in the products for which it was originally planned. Permission to use such fabric must be obtained from WPB. Previously no restrictions were imposed on such fabric. To obtain permission a manufacturer must file application with the WPB for authority, and pending action on his application, he may use up to 10% of his inventory on June 20. However he may not use in any garment or finished product more than 15% of the amount used in such article in May, 1941. But if the 15% limitation requires the use of narrow elastic fabric in lengths of less than three inches, up to 10% of the inventory of such elastic may be used. Applications must be accompanied by a sample of each item at least three feet in length. From these samples the WPB will determine whether the elastic fabric is unsuitable or unnecessary for the essential health articles in which elastic fabric may be used under Amendment No. 7 to Order No. M-15-b, which restricts the use and sale of rubber.

Amendment No. 1 (June 13) to Limitation Order L-90 permits the use of additional elastic fabric for certain types of corsets, girdles, etc., and also further curtails the use of elastic fabric in hose supporters.

Amendment No. 2 (June 17) to General Limitation Order No. L-114 on safety equipment permits the use of rubber for purposes detailed by Supplementary Order No. M-15-b (rubber). The original safety equipment order listed specific permitted uses for rubber. This was considered an unnecessary duplication of the regulations of the over-all rubber order. Amendment No. 2 also permits the use of synthetic plastics when necessary for the efficient operation of hazard-measuring devices.

General Limitation Order No. L-137, issued June 18, restricts the use of elastic fabrics in the manufacture of sanitary belts, sanitary crotch shields, and athletic supports and supensories.

Brett's and Other Appointments

Alden C. Brett, treasurer and comptroller of Hood Rubber Co., Watertown, Mass., on June 2 was made deputy coordinator for rubber, according to Coordinator Arthur B. Newhall. Mr. Brett has been associated with the War Production Board and its predecessor, the Office of Production Management, since last fall, having served as acting chief of the Contract

Clearance Branch of the OPM Purchases Division and as chief of the Industry Co-operation Division of the Office of Procurement and Material. Mr. Brett will be Mr. Newhall's representative in negotiations with South American countries and other government agencies for expanding the supply of rubber received by the United States from countries to the South.

Irwin M. Desser, Desser Tire & Rubber Co., Los Angeles, Calif.; Edward Friedlander, The Lowenthal Co., Chicago, Ill.; and Herman Muehlstein, H. Muehlstein & Co., Inc., New York, N. Y., have been named as scrap rubber representatives to the WPB Industry Advisory Committee for Waste Material Trade.

William E. Umstattd, president, Timken Roller Bearing Co., Canton, O., has been appointed to the Antifriction Bearing Industry Advisory Committee.

George C. Heikes was named chief of the Zinc Branch, WPB, May 29. Since 1940 Mr. Heikes has served as assistant chief of the copper, zinc branch.

J. S. Knowlson, director of Industry Operations, WPB, announced May 26 the formation of a Transportation Committee to obtain information from WPB divisions with regard to transportation requirements and to make recommendations with respect to preferential movement of traffic.

Establishment of a Foreign Requirements Branch in the Bureau of Priorities was announced June 21 by Henry Nelson, assistant bureau chief in charge of requirements. The new branch will be headed by Fred Lavis, Jr., Mt. Kisco, N. Y., who has been a priorities specialist in the Automotive Branch of OPM and WPB since September, 1941. The branch will serve as liaison on priority matters between the WPB, the Lend-Lease Administration, and the Board of Economic Warfare and will receive all applications for priority assistance from foreign governments or purchasers in foreign countries (except Canada) received through these agencies. In cooperation with existing agencies, the Foreign Requirements Branch will develop improved procedures for handling priorities on materials and products for export. One of the chief purposes of the new branch is to obtain a more complete picture of foreign non-military requirements so that they may be related to the broad policy on distribution of materials and products established by the WPB Requirements Committee.

A series of war production conferences, sponsored by cooperative action of six national engineering societies, was held in various sections of the country during June at the request of the WPB. Plant foremen, superintendents, and engineers were asked to bring their shop problems for round-table discussion as a method of solving manufacturing difficulties in war factories.

Other Orders

Conservation Order L-134, issued May 26, provides for WPB control over production and distribution of many types of industrial instruments, regulators and control valves.

General Conservation Order No. M-137, issued June 1, prohibits, after July 1, delivery of more than 50 gallons of benzene to one person in one month except by specific authority of the Director of Industry Operations. Control was instituted because of rapidly growing demand for benzene for making synthetic rubber and other war needs.

A revision of General Imports Order M-63, issued June 2 and effective July 2, orders control of imports of commodities for civilian use as well as strategic war materials. To utilize shipping space to the best advantage it directs that commodities be imported in the order of their importance. Three lists accompany the order which contains rules for importation of the materials on each list. List 1 includes rubber seed and rubber seed oil; List 2 includes antimony; cashew nuts, oil, and shell oil; mica; palm oil; and rapeseed oil; and List 3 includes chicle and natural gums and resins.

General Imports Order M-63-a, issued June 2 and effective July 2, releases from the provisions of M-63 commodities imported overland or by air from Canada or Mexico.

Amendment No. 1 (June 5) to General Limitation Order L-71 (March 27) permits flashlight manufacturers to use up inventories of plated iron and steel at a rate not exceeding their 1940 output. The original order banned the use of several strategic materials including rubber in flashlights after March 31, 1942. The amendment allows use of such materials if they were plated on steel prior to March 31 and provided such plated steel was in the possession of the manufacturer or his supplier prior to that date.

General Preference Order No. E-5, issued June 15, brings under stricter control distribution of gages, precision measuring tools, testing instruments, and chucks. The order revokes and replaces General Prefence Rating Order No. E-1-a, revised, which formerly controlled the distribution of gages and chucks.

General Preference Order No. M-159, issued May 28, places all grades of butyl alcohol under allocation beginning July 1.

General Preference Orders No. M-167 (capryl alcohol), M-168 (isopropyl alcohol), and M-169 (methyl ethyl ketone), issued May 30, place these chemicals under complete allocation July 1. No producer or distributer may use or deliver the chemicals except by express permission of the director of industry operations. Quantities of 10 gallons or less of capryl alcohol and 54 gallons or less of isopropyl alcohol and methyl ethyl ketone are exempt from the restrictions provided that the amount delivered by any producer is less than 2% of his production for that month.

General Preference Order No. M-170, issued and effective June 1, placed styrene under complete allocation control. The purpose of the order was to insure delivery of needed amounts to synthetic rubber plants without prohibiting the use of surplus styrene in plastics manufacture. Because styrene is not storable it is unnecessary now to restrict its use to synthetic rubber manufacture.

An amendment, issued June 8, to Limitation Order L-20 further restricts the use of cellophane or other transparent cellulose sheets of 0.003-inch or less. Among the new prohibitions is one that rubber nipples may not be packaged in cellophane.

Limitation Order No. L-144, issued June 12, prohibits the sale and delivery of laboratory equipment except for certain essential uses in order to save strategic materials and to make certain that such equipment will be available for vital war purposes. Besides making special provision for taking care of requests for equipment for uses not specifically permitted, the Order allows any laboratory or other user to obtain repair parts and operating supplies for maintenance of existing equipment and activities. Included in the critical materials are rubber and synthetic rubber.

Priorities Regulation No. 3, as amended June 10, establishes a uniform method of application and extension of preference ratings.

Supplementary Limitation Order L-37-a, issued May 29, bans the production of musical instruments containing rubber and other critical materials. Effective June 1 no critical materials may be processed for such instruments; after June 30 production of all instruments except pianos and organs must stop entirely; after July 31 no more organs or pianos may be completed or assembled.

The third provisional report on relative scarcity of certain materials,[1] issued June 1 by the Conservation and Substitution Branch of the Bureau of Industrial Conservation, WPB, placed reclaimed rubber in Group 1—materials inadequate for war and essential civilian uses.

With Our Armed Forces

Others of the rubber industry now in military service follow:

James L. Cochrun, Jr., export sales representative for Seiberling Rubber Co., now a captain of infantry, United States Army.

James W. Ferguson, Jr., special representative of The B. F. Goodrich Co., to the Navy.

G. A. Friederici, Goodrich Sales engineer, also to the Navy.

Robert T. Kain, sales engineer, Goodrich belting department, lieutenant, junior grade, U. S. Navy.

B. J. Lemon, of General Development Division, United States Rubber Co., now a lieutenant commander in the Motor Transport Division of the Army Quartermaster Corps.

A. E. MacGee, manager, Skellysolve and Skellyfuel Division, Skelly Oil Co., and a lieutenant commander, U. S. N. R., now on active duty in the Bureau of Ships, Washington, D. C.

John McAbee, of the J. T. Baker Chemical Co., lieutenant, junior grade, Naval Reserve.

Max E. Moyer, assistant manager, flooring sales department, Goodyear Tire & Rubber Co., major, U. S. Army Air Corps.

Henry P. Pryor, chemist in the R. T. Vanderbilt Co. laboratories, now a lieutenant with the Coast Artillery.

Clyde Schetter, Goodyear public relations department, lieutenant, U. S. Navy.

[1] India Rubber World, May, 1942, p. 162.

New OPA Rulings

Amendment No. 7 to Supplementary Regulation No. 1 to the General Maximum Price Regulation and Amendment No. 18 to Revised Price Schedule No. 88—Petroleum and Petroleum Products—both issued June 12, remove price ceilings on synthetic rubber, aviation gasoline, toluene, and materials in order to spur industrial expansion deemed necessary to produce an increasing volume of these war necessities. Synthetic rubber includes rubber of the butadiene-styrene copolymer, Perbunan, neoprene, "Thiokol", Butyl, Koroseal, flammenol, and acrysol types. Also covered are the following, to the extent sold or delivered for use in the manufacture of synthetic rubbers: components of synthetic rubbers, including but not limited to butadiene and styrene; all hydrocarbons and petroleum fractions used in the manufacture of butadiene and styrene, including but not limited to ethylene, propylene, butylene, iso-butylene, propane, butane, and iso-butane; hydrogen, acetaldehyde, acetylene, vinylacetylene, vinyl chloride, vinyl acetate, sebacate esters, phthalate esters, tricresyl phosphate, hydrochloric acid, calcium carbide, ethylene dichloride, dichlorethyl ether, sodium polysulphide, butylene glycol, and acrylonitrile.

Maximum Price Regulation No. 157 (Sales and Fabrication of Textiles, Apparel and Related Items for Military Purposes), issued June 3, establishes maximum prices for the following commodities when made in accordance with military specifications: (1) yarns, textiles and textile products; (2) leather, fur, and products thereof; (3) rubber fabrics, apparel, and footwear; (4) and wearing apparel, including findings, and other individual, organizational, or ship's personnel equipment made in whole or in part of any of the materials mentioned in (1) and (2) or from rubber, except druggists' sundries. The order gives a method for pricing the aforementioned items that may be sold or delivered to war procurement agencies after July 1, 1942. Ceilings are set at the highest price at which sale or delivery of a particular article was made before April 1, 1942, plus an amount proportionate to the seller's increases in material and labor costs between the time the contract was placed and March 31, 1942, plus increases in wage rates pursuant to certain collective bargaining contracts or other wage agreements entered into before April 27, 1942.

Amendment No. 1 (June 4) to Maximum Price Regulation No. 132—Waterproof Rubber Footwear—specifically exempts from that order sales of waterproof rubber footwear under contract with any war procurement agency of the United States or with anyone who buys for resale to such an agency, i.e., the War and Navy departments, the Maritime Commission, and the Lend-Lease section of the Treasury Department's Procurement Division. Such exempted sales, however, are subject to Maximum Price Regulation No. 157, which sets ceilings on sales of apparel for military purposes.

Maximum prices at which Transcontinental Rubber Corp., New York, N. Y., may sell two items of waterproof footwear being manufactured under WPB permit, have been established by Order No. 1, under Maximum Price Regulation No. 132, announced June 9. The items in question are two kinds of latex women's footholds—rubbers covering only the forepart of a shoe. Plain women's footholds, as described in Transcontinental's application to OPA to set maximum levels, may not be sold for more than $0.7917 a pair, under the order, or dotted women's footholds above $0.917 a pair. In both cases all the usual trade discounts must be deducted from the maximum levels, and the ceilings apply only when the items have been made since February 11, 1942.

Order No. 1 was issued under a section of Regulation No. 132 which provides for establishment of maximum prices on items for which specifications are not the same as those on a list of articles for which price ceilings are set in the regulation.

Amendment No. 2 to Maximum Price Regulation No. 107, issued May 22 and effective May 26, provides that unrepaired used passenger car or truck tires may not be sold at the ceiling price which would apply if they were undamaged or repaired. The maximum price applying is the level established in Regulation No. 107, less an amount equal to the charges prevailing in the locality of the seller March 7, 1942, for the repairs necessary.

Relating to Tires

The OPA announced May 29 that retreaders and recappers who had not applied for an initial allotment of camelback for treading passenger car-tires may do so, but will be required to submit to local boards a valid reason for having failed to apply prior to the April 30 deadline. Provision is also made for allotments for molds acquired after a retreader applied for his initial allotment on other molds in his shop.

The OPA has taken steps to eliminate careless work in recapping of tires and to arrange for technical advice for retreaders unskilled in applying the new reclaimed camelback rubber. Deputy Administrator John E. Hamm has requested state OPA directors to ask local rationing boards for names and addresses of retreaders against whom have been lodged an excessive number of consumer complaints. The request also suggests that the name of the retreader's camelback supplier be furnished to enable OPA to contact the supplying company, which in turn could assist the retreader in his technical difficulties.

Amendment No. 11 to the Revised Tire Rationing Regulations, issued May 29 and effective June 1, provides regional reserve quotas of tires and tubes upon which OPA regional administrators may draw for emergency needs. Regional reserves will neither increase nor decrease the total of all reserves; they will facilitate allotment of additional quotas to states where heavy demand exhausts the regular quota and the state reserve.

Amendment No. 12, effective June 8, makes provision for new tires and tubes for children's summer camp buses and for certain buses transporting selectees to and from examination and induction centers.

Amendment No. 13 removes certain restrictions on the sales of five-ply tires, which now may go to any holder of a four-ply casing certificate.

Amendment No. 14, issued June 17 and effective June 22, clarifies the procedure by which owners of tires and tubes in public warehouses may withdraw them for their own use on eligible vehicles by presentation of a rationing certificate. The amendment also eliminates the date of storage as a factor in determining whether new tires or tubes, retreaded or recapped tires, or camelback may be withdrawn from public warehouses by tire dealers, distributers, and manufacturers.

The fifteenth amendment, issued June 17 and effective June 22, makes eligible for tires vehicles operated principally for official use by heads of foreign diplomatic missions formally accredited to this country.

The sixteenth amendment, issued June 19 and effective July 15, provides that war workers are eligible for third-, fourth-, and fifth-line new tires under certain conditions. Also included is a system whereby each tire will deliver the utmost in essential transportation.

Additional Appointments

Charles F. Phillips was appointed to the newly created position of director of the Automotive Supply Rationing Division on June 22 and will supervise tire and passenger automobile rationing activities and rationing of bicycles, soon to begin. Dr. Phillips had only recently been made chief of the Tire Rationing Branch, a post to which Robert S. Betten succeeds. Mr. Betten, formerly was associate chief of the Branch.

Ben W. Lewis, price executive of the rubber price branch, has been named special representative aiding in field price administration. He will have primary responsibility in the selection of field price personnel and will act as consultant to the OPA Deputy Administrator, J. K. Galbraith, on matters relating to the executive functioning of the field price staff.

Robert F. Bryan, associate price executive of the rubber price branch, will be in charge of that branch while Mr. Lewis is engaged in his new duties.

The OPA on May 29 appointed John C. Stedman, associate professor of law at the University of Wisconsin, Madison, Wis., as head of the legal department of the tire rationing branch, and John N. Cole, of the anti-trust division of the Department of Justice, to the corresponding position in the rubber price branch. They succeed Daniel Margolies, transferred to the Board of Economic Warfare.

Henry S. Reuss was appointed, June 4, assistant general counsel in charge of the General Products Price Division of OPA's legal division. Mr. Reuss will be in charge of legal work relating to the price regulation of rubber and other materials.

To Make Typewriter Rollers Longer Lasting

The OPA has announced a new rubber-saving process for renovating typewriter rollers whereby typewriter users can make an important contribution to the nation-wide rubber conservation campaign. The process is said to make old rollers as good

as new and increase their service by several years; it requires no rubber. An ordinary sand or grit blasting machine, as used by metal polishers, is utilized. Hard films of dirt and dried ink are blasted from the surface of the rollers, leaving the live rubber beneath clean and smooth. The operation can be repeated several times.

The importance of this discovery is demonstrated by the fact that more than 1,000,000 typewriter rollers must be replaced or renovated every year in this country.

The process was developed by the Bell Telephone Laboratories. Further details may be obtained from the Standards Section Consumer Division, Office of Price Administration.

Revised Rubber Export Rulings

The Board of Economic Warfare, Office of Exports, Washington, D. C., in "Current Controls Bulletin No. 26", dated June 1, 1942, covers "Exports of Rubber—Applicability of Rubber Restrictions—Crude, Reclaimed, Scrap, Synthetic Rubber and Rubber Manufactures" as follows:

1. On March 7, 1942, general and unlimited licenses authorizing exportation of all rubber and rubber manufactures were revoked. This revocation applied to all shipments regardless of value, but did not affect Lend-Lease shipments, exportations in personal baggage, the general in-transit license authorizing shipments between parts of the British Empire, or shipments made under General License GUS. Accordingly, individual export licenses have been required for all exportations of rubber and rubber manufactures except as specifically excluded above. A general license for exports of all rubber and rubber manufactures to Canada was issued on April 9, 1942, subject, however, to Canadian import controls.

2. On May 20, 1942, the applicability of the restrictions with respect to rubber was modified and further defined as follows:

a. Shipments of rubber hose and tubing or belts and belting in the form of aircraft replacement parts will not be considered hereafter as shipments of rubber. Such articles will be treated as aircraft parts under the appropriate Schedule B Number.

b. Also rubber manufactures in the form of component parts of a finished article (such as rubber washers in a pump or a rubber fan belt in an automobile) are *not* included in the rubber restrictions, but are to be considered with the finished article under the appropriate Schedule B Number for that article. This applies also where complete machines are shipped in a knocked-down or unassembled condition. In the case of vehicles with tires, however, where an individual license is required, the individual license for the vehicle must state, after May 30, 1942, the number of tires licensed with the vehicle.

c. Balata, gutta percha, gutta siak, gutta jelutong, or pontianak and manufactures of balata, gutta percha, gutta siak, gutta jelutong, or pontianak, if containing no crude, reclaimed, or synthetic rubber, will not fall within the rubber restrictions. These articles may be shipped under *general license* to Canada (G-1), Great Britain and Northern Ireland (G-2), Iceland (G-62), Greenland (G-61), Newfoundland (G-47), and the U. S. S. R. (G-76), but may not be shipped under *any unlimited license*.

d. Except as noted in a, b, and c, the rubber restrictions apply specifically to:

Crude rubber (Schedule F Number 2001)

Reclaimed rubber (Schedule B Number 2011)

Scrap rubber (Schedule B Numbers 2012.05 and 2012.98)

Synthetic rubber (Schedule B Number 2099.3)

Rubber manufactures, whether such manufactures contain crude, reclaimed or synthetic rubber (Department of Commerce Schedule B Numbers 2014 to 2098 and 2099.9[1]).

[1] Schedule B Number 2099.9—"Other rubber manufactures"—includes miscellaneous articles not specifically set forth which contain, either by value or quantity, over 50% rubber (whether crude, reclaimed, or synthetic rubber), but *not* aircraft replacement parts, replacement parts for automobiles and other vehicles, replacement parts for other machinery, or insulated wire or cable.

Army Replaces Rubber with Substitutes

The War Department, Washington, D. C., reported May 28 a series of regulations designed to conserve Army rubber and gasoline requirements. Standing orders of the Army now include: pooling use of motor transportation; using animal-drawn vehicles where obtainable; elimination of unnecessary trips; maintenance of properly inflated tires and alined wheels; and enforcement of the principles that Army vehicles are never used to transport military personnel to or from homes. All service men driving cars or trucks will conform to established speed limits.

Other restrictions include the replacement of crude by reclaimed rubber in tires to the limit consistent with adequate and safe performance. Synthetic resins are now used in place of rubber in Army raincoats, and in a short time both crude and reclaim will be eliminated from almost all lines of clothing and equipment. Low-pressure hose, rubber set brushes, matting, hospital sheets, mattress covers, athletic shoes, foot tubs, tentage, bumper-strippers, shoe heels, and chemically blown sponge products will be made of rubber substitutes.

Army tire retreading shops are expected to save an estimated 75,000 tons of rubber a year.

Testifying May 29 before the House Committee on Interstate Commerce Major John S. Burgess, Jr., said the Army had started its rubber conservation program almost a half year before the attack on Pearl Harbor. Army directives for tires and tubes, accounting for 70% of the Army's total rubber consumption, were issued in January, resulting in a saving of thousands of tons of rubber through reduction in the number of tire sizes and construction of retreading shops at posts, camps, and in the field, he stated. At arsenals and ordnance works tires are inspected daily for cuts, bruises and embedded metal parts, and magnetic pick-up devices are used in sweeping streets and alleys.

Another saving will result from the elimination of cuffs, or gauntlets, on heavy work gloves, of which the Quartermaster Corps is purchasing 1,200,000 pairs. As the cuff linings in a pair of the former type contained about an ounce of reclaimed rubber, which is not used in the new gloves, about 33 long tons of reclaim will thus be saved.

New Advisers Named

The War Department on May 29 appointed more than 50 civilians as field consultants on the new Advisory Board to the Resources Division of the Office of the Army Quartermaster General. E. B. Babcock, chief chemist, Firestone Tire & Rubber Co., Akron, O., and Bradley Dewey, president, Dewey & Almy Chemical Co., Cambridge, Mass., represent rubber. Willard Dow, president, Dow Chemical Co., Midland, Mich.; R. M. Banks, vice president, American Cyanamid & Chemical Co., New York, N. Y.; M. G. Millikan, vice president, Hercules Powder Co., Wilmington, Del.; Ernest W. Reed, WPB; Elmer K. Bolton, chemical director, E. I. du Pont de Nemours & Co., Inc., Wilmington; J. W. Livingstone, vice president, Monsanto Chemical Co., St. Louis, Mo., have been named among the consultants on synthetics.

Rubber Reenforcers

Three resins currently of interest in rubber compounding are Nevindene, "G" Resin, and 465 Resin, products of The Neville Co., Pittsburgh, Pa.

Neville 465 Resin (sp. gr. 1.20 at 77° F.) is a reenforcer with physical properties similar to the straight Neville coumarone-indene resins. It is made from materials obtained from the by-product coking of bituminous coal. This glossy dark-brown solid is permanently thermoplastic and has a melting point range of from 110° to 125° C. It is offered in a neutral or slightly alkaline, and a faintly acidic grade.

Nevindene and "G" Resin are thermoplastic coumarone-indene resins, stable and inert and non-toxic. They are completely soluble in many commercial solvents, except the alcohols, and resistant to oxidation, alkalies, salts, and dilute acids. Nevindene is a high melting resin, extremely hard, of coal-tar origin. On heating to 225° C. for five minutes, it darkens slightly with no decomposition, but has a mild odor. Its uses include dental and insulating compounds. "G" Resin, a reenforcer, is made in the medium-hard range. It is a brittle solid at ordinary temperatures; in the lump it is dark red with a greenish cast.

Puritan Rubber Co., Trenton, N. J., has practically dropped its old line of production to take care of government orders. The concern is operating normally.

EASTERN AND SOUTHERN

New Reclaiming Process: Other U. S. Rubber News

United States Rubber Co., 1230 Sixth Ave., New York, N. Y., has developed a reclaiming method for used rubber which is said to improve the quality of the product, save materials, and reduce the processing time from 16 to 9½ hours, thus increasing the capacity of certain existing equipment by 60%. The method includes the introduction of air into the chamber with the scrap, increasing the steam pressure to raise the temperature, reducing the amount of pine tar oils, and cutting the time for agitation of the mixture. The quality of the finished reclaim is improved because of a change and a reduction in the chemicals used in the process, according to W. G. Kirby, manager of reclaim development of the company's Naugatuck Chemical Division.

Scrap Rubber Survey

Contradicting recent claims that "many millions of tons" of scrap rubber are available, U. S. Rubber, in a special study released last month after a survey of the last five years' supply by its Business Research Department, estimated that approximately 500,000 long tons of scrap might be recovered by intensive collection methods.

A shortage in the 1941 surplus of tires is foreseen since old tires are back in use, following restricted new tire sales. With 1,600,000,000 pounds of tires available in 1941, 714,000,000 pounds were consumed by reclaimers. The study estimates that about 50% of the remainder is recoverable. A good part of the 1940 surplus should be gathered, the company feels, since this should be too far gone for re-use and yet not out of sight too long to preclude its reappearance. This figure is also fixed at 50% of the surplus or 330,000,000 pounds. Beyond these years the estimate is speculative, but the recoverable invisible supply is believed to be about 25% for 1939, or 220,000,000 pounds, and 10% each for 1938 and 1937, or 78,000,000 and 60,000,000 pounds respectively. This total reaches 500,000 long tons.

Stocks of scrap rubber have fluctuated widely since the war began. Between November and December, 1941, stocks on hand and due on contract hit a record high. Thereafter, however, they declined rapidly, from a normal eleven-month stock position to about a four months' supply.

The number of tires scrapped each year is computed by a method which sets up the number of tires at the beginning of the year (on cars and in stocks). The production is added, net exports deducted, and the difference between this figure and tires in sight at the year-end represents tires scrapped.

The average tire in late years weighed 28.7 pounds when new and lost 12% in use, thus averaging 25 pounds when scrapped. To arrive at the net available supply the volume of scrap is increased 10% to allow for tube and other types of scrap, and net exports are deducted.

It is generally agreed that about 85% usable rubber is yielded from scrap.

The company further reported that a 50-foot length of old garden hose will furnish rubber equivalent to that in a Navy inflatable life raft. Two old tires equal one new tire for an Army jeep. Two old inner tubes add up to three heavy Army gas masks. Three discarded rubbers furnish enough reclaim for one Army overshoe. One hot water bottle has enough rubber for two yards of hospital sheeting.

X-Ray Reveals Rubber Content of Plants

The crystal structure of rubber is denoted by white spots on the rims of the spheres in the accompanying X-ray photographs. In Figures 1, 2, and 3, the patterns of the spots are identical, indicating the plants have the same rubber value. The absence of spots in Figure 4 indicates there is little or no useful rubber in the plant. The pictures are of sample sheets of material vulcanized from compounded resins. Each sample was $\frac{1}{10}$-inch thick and stretched 300 to 400%. They were made by U. S. Rubber in an investigation of domestic rubber-yielding plants.[1]

[1] See also our June issue, p. 274.

Other Notes

Emmet Sheahan, general manager of the company's tire division, has been made assistant to President F. B. Davis, Jr.

U. S. Rubber has made Carl A. Ostling, expert on plant layout, director of engineering. His immediate assignment is to hasten conversion of the company's properties to war work.

The War Department announced May 29 the award of a contract to U. S. Rubber for consultant service in connection with a manufacturing plant in Wisconsin.

U. S. Rubber has also received a contract from the War Department to operate a new manufacturing plant in Ohio. This is the third arsenal which the government in the last year has requested the rubber company to operate. Ernest G. Brown, former production manager of the company's mechanical goods, general products, and rubber thread divisions, has been appointed general manager.

President F. B. Davis, Jr., has been appointed a member of the executive committee of the Industrial Salvage Committee for Greater New York. The organization will conduct a drive to collect scrap rubber and other waste products from the 26,000 factories in the metropolitan area.

Willis A. Gibbons, director of the general development department, was recently awarded the honorary degree of Doctor of Science by Wesleyan University. Dr. Gibbons received his B.A. from Wesleyan in 1910 and his M.A. in 1911. Cornell awarded him a Ph.D. in 1916.

Manufacturing Chemists Association last month held its annual meeting at the Waldorf-Astoria Hotel, New York, N. Y., at which Harry L. Derby, president, American Cyanamid & Chemical Corp., New York, was elected president for 1942-1943, succeeding Lammot du Pont, chairman of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Mr. du Pont succeeds Mr. Derby as chairman of the Association's executive committee. Among the speakers at the meeting, which was devoted to the war effort, were E. W. Reid, chief of the WPB Chemicals Branch, and E. R. Wiedlein, technical adviser to the Rubber Reserve Co., who discussed the synthetic rubber program.

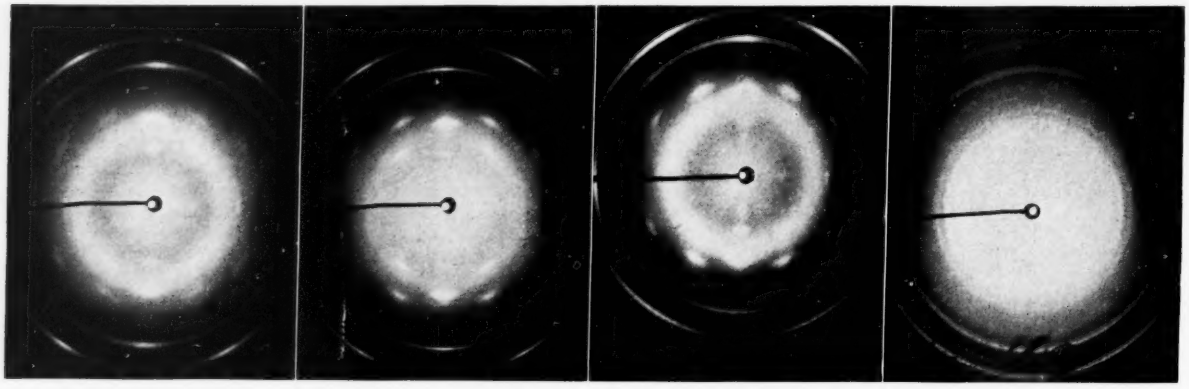


Fig. 1. *Cryptostegia Grandiflora* (Central American Asclepiad Twiner)

Fig. 2. *Forsteronia Floribunda* (West Indies Vine)

Fig. 3. *Hevea*

Fig. 4. *Asclepias Subulata* (Milkweed)

Rubber at Inventors' Show

The Annual Inventors' Exposition was held June 1 to 13 at Sachs Furniture Co., 505 Eighth Ave., New York, N. Y., under the auspices of the American Hobby Federation. A feature of the exhibit was a sample of synthetic rubber produced by Anthony Morsh, of Jamaica, L. I., N. Y., which is reputed to have physical properties similar to those of natural crude. On a 3,000-mile test embracing a variety of road conditions, tires of the material were found to be effectively resistant to heat and abrasion, Mr. Morsh said. The synthetic, also reported resistant to oils and acids, is a combination of four ingredients, one of which Mr. Morsh revealed as a derivative of coal. The material is formed under heat and pressure in chambers that could of necessity be made from fire clay, and a catalyst is used in the process. On the basis of an annual production of 700,000 tons the rubber could be produced at a cost of 10c a pound from ingredients that are not under priority restrictions and which are abundant in the United States.

Among the rubber novelties displayed were an automatic window cleaner composed of a squeegee of sponge rubber attached to window sashes; a chin patter for fat removal; dunking gloves; and a moisture-proof garbage bag.

Mellon Institute of Industrial Research, Pittsburgh, Pa., has announced the establishment of a multiple fellowship on chemical containers and storage by Pittsburgh-Des Moines Steel Co. The Chemical Storage Fellowship will utilize the scientific resources of the Institute in furthering work on all bulk-chemical storage problems in industry, with special current emphasis on hydrocarbons such as petroleum, gasoline, and natural gas. Of particular urgency at present is the work of the Fellowship staff on storage in the synthetic rubber industry, including the basic chemicals, butadiene, styrene, acrylonitrile, isobutylene. The senior incumbent of the Fellowship is James Bert Garner, who is aided by Ludwig Adams and R. M. Stuchell.

American Management Association, 330 W. 42nd St., New York, N. Y., on June 11 celebrated its twentieth anniversary at a dinner meeting at the Hotel Pennsylvania, New York. Among the speakers were former officers, including Cyrus S. Ching, director of industrial and public relations, United States Rubber Co., New York. Among the new officers listed are the following, elected directors for a term ending in 1945: Oliver S. Benz, development department, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and Arthur Batts, president, Carborundum Co., Niagara Falls, N. Y.

Blue Ridge Rubber Co., a subsidiary of the Cambridge Rubber Co., Cambridge, Mass., according to General Manager Ernest W. Dunbar, has purchased the plant of the Cannon Shoe Co., at Littlestown, Pa. Rebuilt machinery from the Taneytown, Md., plant of the rubber company, which was destroyed by fire recently, will be used in the Littlestown factory.

H. Muehlstein & Co., Inc., crude rubber dealer, 122 E. 42nd St., New York, N. Y., has sent out a combination map-calendar entitled "News Fronts of the World", which features maps of the world, Europe, Asia, the Philippines, Malay Peninsula, and Hawaii; a picture and a brief biographical sketch of General MacArthur; and calendars for 1942 and 1943.

Pittsburgh Plate Glass Co., Pittsburgh, Pa., has appointed Alfonse Pechukas as acting director of research of the Columbia Chemical Division, succeeding Irving E. Muskat, resigned. Dr. Pechukas has been associated with the company for the past five years.

Herschel E. Post, previously manager of Pittsburgh Plate's Houston, Tex., paint factory, has been appointed general sales manager, industrial finishes division, with headquarters at Pittsburgh. John A. Hanley, production manager, will temporarily manage the Houston plant.

Frank Clarke has been made general manager of the company's warehouses, succeeding B. J. Cassady, who resigned after 44 years of service because of ill health. Mr. Clarke had joined the company in 1913 and served in various capacities, most recently as district manager with headquarters in St. Louis.

Hercules Powder Co., Wilmington, Del., has been awarded a War Department contract for consultant service in connection with the construction of a plant in Kansas.

Production of solvents and chemicals from southern pine wood is held sufficient to meet wartime needs of the rubber reclaiming industry, according to Charles A. Higgins, Hercules president, at the opening of the nation-wide scrap-rubber collection campaign. The company, anticipating a greater demand by reclaimers for its Solvenol, Tarol, and Staybelite used in reprocessing, last year expanded its Brunswick, Ga., and Hattiesburg, Miss., plants.

Reclaim production in the United States in 1941 exceeded 25% of total American rubber consumption. Volume increased from 210,000 long tons in 1940 to 280,000 long tons, and this year estimates call for more than 300,000 long tons of regenerated rubber.

Raybestos-Manhattan, Inc., Manhattan Rubber Mfg. Division, Passaic, N. J., has issued a wall card on the care of rubber belts, the third of a series, available on request. Instructions for the care and installation of rubber transmission belts, V-belts, and conveyer belts are given.

Manhattan Rubber's advertising campaign, of which conservation of rubber goods was the keynote, was chosen the best in its class in the Best Business Paper Campaign competition at the annual convention of the National Advertising Agency Network in St. Louis, Mo., May 28 to 30. This is the second consecutive year Manhattan has won a national award for an advertising campaign.

L. D. Walker, recently chief chemist of Triangle Conduit & Cable Co., Inc., Elmhurst, L. I., N. Y., is now associated with Herron & Meyer, 82 Beaver St., New York, N. Y.

"Thiokol" Type N for Tires

A new type of synthetic rubber which has given good results in severe road tests by a large tire manufacturer and which will be available for recapping for essential civilian uses probably by next fall has been announced by the Thiokol Corp., Trenton, N. J. A large plant for the production of this new Type N "Thiokol" should be completed by midsummer; and since this synthetic rubber is not restricted to only military usage, it should be of considerable importance in supplementing our available supplies of reclaimed rubber, portions of which will be used for tire repair and replacement essential in providing transportation for war workers.

Murray Rubber Holding Co., Trenton, N. J., will make alterations to buildings to cost $9,000.

American Hard Rubber Co., 11 Mercer St., New York, N. Y., according to President F. D. Hendrikson, has appointed Paul Brown assistant vice president in charge of operations at the company's Butler, N. J., plant, where he will have his headquarters. Mr. Brown was formerly assistant to the president, in charge of manufacturing, at the Standard Coated Products Co., New York, N. Y.

American Petroleum Institute, 50 W. 50th St., New York, N. Y., recently named to its Central Committee on District Activities of the Division of Production, George Berlin, of Skelly Oil Co., Pampa, Tex., and O. W. Van Petten, of Columbian Carbon Co., Charleston, W. Va.

The Fifteenth National Exposition of Power and Mechanical Engineering will be held the week of November 30 at Grand Central Palace, New York, N. Y. To date more than 125 exhibitors have already engaged space. Displays are being planned that will aid the war effort.

Crescent Insulated Wire & Cable Co., Trenton, N. J., reports an increase in business with three 24-hour shifts and seven days a week in some departments.

Leo T. Crowley, Alien Property Custodian, Washington, D. C., on June 15 issued an order requiring all persons claiming any interest in patents or patent applications now or formerly owned by nationals of designated foreign countries to report their interest, including any license agreement or claims of ownership, on Form APC-2 by August 15, 1942.

Electric Storage Battery Co., Philadelphia, Pa., has named R. L. Somerville as manager, automotive sales division. T. G. Tynan has been appointed supervisor, replacement sales, and R. S. Gray, supervisor, manufacturers sales, the two departments of the division.

Thermoid Co., Trenton, N. J., reports April sales for itself and domestic subsidiaries at $1,121,181, against $1,098,851 in March and $1,040,646 in April, 1940. May sales were $965,222, against $914,493 in May, 1941.

OHIO

Goodrich Expanding Rubber Research Program

Increased study of present sources of rubber in North America and a search for new materials will be undertaken immediately by The B. F. Goodrich Co., Akron, according to H. E. Fritz, director of research. Heading the new project is Harlan L. Trumbull, since 1922 manager of the company's chemical research department and for the past 23 years associated with Goodrich in research capacities. He is also a member of the American Chemical Society and the American Institute of Chemical Engineers and has written and lectured on the rubber industry for the past 15 years.

Other News

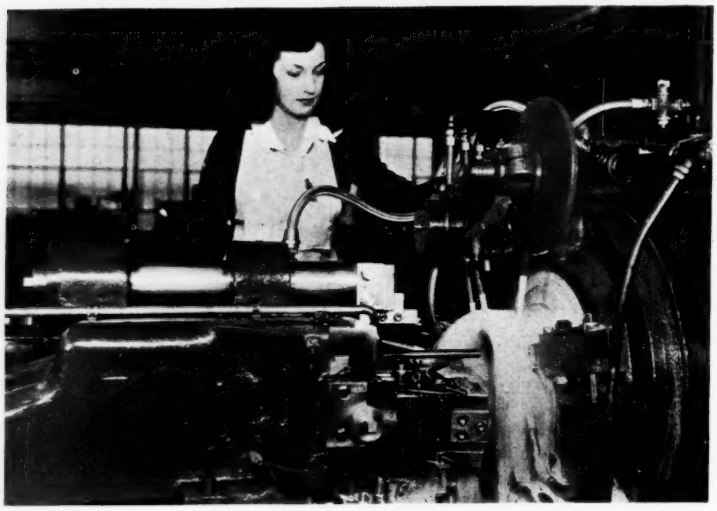
President John L. Collyer announced June 2 the retirement, for reasons of health, of Vice President V. I. Montenyohl. He had been elected treasurer of the company in 1927 and vice president in 1940. Since 1928 he had been on the Goodrich board and had also directed the activities of the International B. F. Goodrich Corp., of which he was president. In recent years he had been responsible for the Koroseal, chemicals sales, and traffic divisions, and was president of the Philadelphia Rubber Works Co. Mr. Montenyohl had joined Goodrich as a stenographer in the credit department in June, 1907.

G. R. Brunner, general manager of the Goodrich national sales and service division, has announced the transfer of G. G. Zimmerman to Washington, D. C., from Miami, Fla., where he had been manager of the company's retail store since 1939. G. R. Empson, recently sales supervisor of the Washington district, has also been transferred to the Washington office of the division. F. T. Marshall is now in charge of the Baltimore, Md., office of the division.

L. H. Chenoweth, manager, manufacturers' sales, Goodrich Industrial Products Sales Division, has been granted a leave of absence to serve on the Rubber Products Division of the War Production Board. While he is on leave Mr. Chenoweth's duties in the company's Washington office are being handled by I. N. Kimsey, Akron district manager.

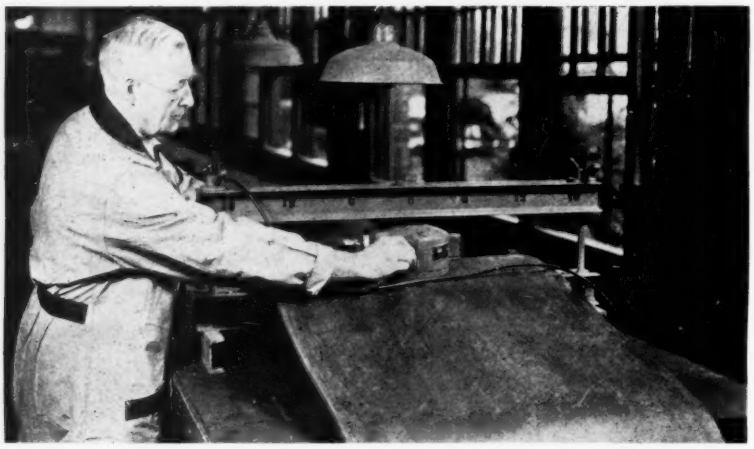
Goodrich has completed a new sound film now ready for national release, "Keep 'Em Rolling." Its theme is the part rubber plays in every major field of economic life and in the present conflict.

Silvertown News, Goodrich dealer publication, was awarded a certificate of excellence by the National Council of Industrial Editors Associations in convention at Chicago, Ill., in May. The publication, edited by Preston Bergin, was cited for its superior quality in the industrial press field.



Said to Be the World's Largest Single Spindle Bar and Tube Turning and Boring Machine, in Service at Timken Roller Bearing Co., Canton, O.

Edward N. Jacobs has been made manager of Goodyear Industrial University, succeeding N. N. Alspach, transferred to Goodyear Aircraft.



Type RO patch vulcanizer for conveyer belt covers. A single heated platen clamps against a 12-inch steel plate held against the opposite sides of the belt. B. F. Goodrich Co.

U. S. Stoneware Acquires Lower Rubber Mfg. Co.

The Chamberlain Engineering, Ltd., a unit of The United States Stoneware Co., Akron, last month purchased the business and mechanical rubber goods factory of the Lower Rubber Mfg. Co., Ravenna, O. This plant will be used mainly for milling, calendering, extruding, and molding operations on the Tycon series of synthetic rubber-like materials. Provision will also be made for the production of U. S. Stoneware's "Duralon", the synthetic resin with a polymerized furfural orthosilicate base, as a substitute for hard rubber in all extruded and molded shapes.

The varied mechanical rubber goods line of the former Lower company will be retained, and many new rubber items will also be produced for the Chemical Warfare Service and other war agencies.

The technical facilities and sales organizations of the two companies will be merged. M. S. Lower, former president of the Lower Rubber Mfg. Co., will serve as general manager of the plant, which will be operated as the Lower Rubber Mfg. Division.

Seiberling Rubber Co., Akron, through J. L. Cochrun, vice president in charge of sales, has announced several changes in the advertising and related lines department. N. E. Malone has been made merchandising manager. Succeeding him as advertising manager is George F. Weisenbach, formerly with the Firestone Tire & Rubber Co., Akron. Manager of the related lines department is E. L. Parker, member of Seiberling's service sales department.

Buy War Bonds! Our Nation's Auxiliary Line of Defense—The Dotted Line!

NEW ENGLAND

New England Butt Centenary

New England Butt Co., 304 Pearl St., Providence, R. I., is celebrating its one hundredth birthday, having been founded in 1842 for the manufacture of butt hinges, which were then imported from England. After a few years of indifferent success the foreign article was superseded by the home product, and the company began to prosper. It was incorporated in 1853 and with larger capital and other lines of hardware continued to grow until it became the leading manufacturer in its field in the country.

Then in 1855 the firm started manufacturing braiding machines, which previously had been imported and operated to a limited extent here. Specializing in this device, New England Butt soon developed the machine for all the different varieties of braids and cords so largely used for many purposes. The growth of the electrical industry created a new field for the braiding machine for insulating copper wires, and the company designed equipment to meet the new demand. As the science advanced, other machinery was required, and the company gave this line its special attention. Now it receives orders for its equipment from all nations.

Farrel-Birmingham Co., Inc., Ansonia, Conn., in a recent contest in its Ansonia and Derby plants for a wartime slogan selected "Farrel Drives for Victory", submitted by Jeanette Larson, office secretary. This slogan was chosen because it expresses the thought that in building drives for Navy, Maritime Commission, and other ships, Farrel workers contribute to the nation's drive for victory.

Godfrey L. Cabot, Inc., Boston, Mass., has announced that through one of its subsidiaries it has received a substantial order for munitions from the War Department. Cabot Shops, Inc., is presently expanding its facilities and installing the necessary equipment to manufacture gun steel and gun tube forgings. This company is essentially the construction and maintenance division of Cabot's carbon black and natural gasoline operations in the Southwest and has, for the last several years, been manufacturing and distributing nationally a full line of oil-well pumping units and oil-field surface equipment.

The Seamless Rubber Co., New Haven, Conn., manufacturer of electrical heating pads for use in treating disease, has been ordered by the Federal Trade Commission, Washington, D. C., to cease misrepresentations in the sale of its products. Commission findings are that the respondent represented its pads as being capable of generating and maintaining three different sustained levels of temperature and that the temperature may be controlled and the desired uniform heat obtained by simply setting the switches at points marked "L", "M", or "H". Actually the heating pads are not capable of maintaining three sustained levels of temperature. The sole function of the switches attached to the pads is to regulate the input or wattage of electric current used by the pads and thus to some extent control the speed with which the maximum temperature will be attained, according to findings. The Commission order directs the respondent to cease advertising that its heating pads are each provided with a switch or other heat-regulating apparatus which may be set in a manner to provide for maintaining heat in the pads at more than one sustained level of temperature.

Rhode Island rubber manufacturers during April had 3,880 employes, against 4,229 in March and 4,934 in April, 1941. In April, 1942, man-hours worked totaled 160,352, 7.4% less than in March and 19.6% less than in April last year.

Duro Gloss Rubber Co., New Haven, Conn., is not a new incorporation, as reported on 278 of our June issue, but was incorporated in January, 1933, as a successor to J. C. Haartz Co., which was organized about 1919.

MIDWEST

Thirty-eight rubber firms in the Midwest recently paid 19,082 workers $664,000 in wages, a decline of 0.2% in the number of employes, but a rise of 3.2% in payments over the previous month.

Rubber Materials Corp. on June 15 moved its office and warehouse from 50 E. Canfield Ave. to 31 Parsons St., Detroit, Mich.

OBITUARY

Charles E. Wood

CHARLES ELGAR WOOD, president and founder of Charles E. Wood, Inc., 52 Wall St., New York, N. Y., died suddenly on June 10 at his home in Montclair, N. J. Born in Piermont, N. Y., October 22, 1876, the deceased attended public schools and Trinity School.

Then he entered the employ of the New York Commercial Co., where he remained 19 years, mainly as cashier and finally as salesman. On March 17, 1913, however, Mr. Wood started business as a broker in crude rubber, balata, gutta percha, and kindred products. Then in 1922 he incorporated his business as Charles E. Wood, Inc.

The broker was a member of Masonic orders, Commodity Exchange, Inc., and the Rubber Trade Association of New York, Inc., and an associate member of The Rubber Manufacturers Association, Inc.

Services were held in Montclair on June 12. Burial occurred in Mount Hebron Cemetery, Upper Montclair, the next day.

Survivors include the widow, a daughter, and two sons, one of whom, Richard H., is secretary of Charles E. Wood, Inc.

Max Kalter

MAX KALTER, president of the Servus Rubber Co., Rock Island, Ill., died suddenly at his home in New York, N. Y., May 17. He had been a partner in Kalter-Arronson Associates which had purchased the footwear concern on September 30, 1936. Mr. Kalter was also treasurer and a director of General Furniture Co., Chicago, Ill., and a director of the Pierce Butler Radiator Corp., Syracuse, N. Y. He had recently been appointed to the WPB Waterproof Rubber Footwear Industry Advisory Committee.

The deceased, who was born January 24, 1878, also belonged to the Temple Israel of New York, the Masons, the New York Chamber of Commerce, and the City Athletic Club. Moreover he had served with the United States Army in the Spanish-American War and with the British Army in the Boer War.

Funeral services were held May 19 at Riverside Memorial Chapel, New York, with burial at Ferncliff Cemetery, Ardsley, N. Y.

His wife, a sister, and a brother survive.

CANADA

National Selective Service Board, Ottawa, Ont., has announced that production of synthetic rubber falls within the category of chemical industries not on the list of restricted occupations. The announcement said that although manufacture of rubber products appears under restricted occupations, production of tires and certain other products is of utmost importance in the war effort. Labor in this industry, it was stated, should regard itself as engaged in vital work, and any enticement of labor from such employment by other employers is a violation of the so-called "poaching" order in council. The announcement added that National Selective Service offices throughout Canada have been been instructed to issue permits freely for employment in the production of such rubber goods and to take every step possible to make labor available to the rubber industry.

Canadian Manufacturers' Association, Granby Branch, has elected John Miner vice chairman and John C. Bouskill honorary secretary. Both men are connected with Miner Rubber Co., Ltd., Granby, P. Q.

National Research Council is investigating the production of a substance from cereals which may prove superior to alcohol in the manufacture of butadiene, according to a return tabled in House of Commons, Ottawa, Ont., June 8.

Further Rubber Restrictions

Scope of the regulation making it an offense to destroy tires has been broadened to include all scrap rubber, according to the Dominion Department of Munitions and Supply, Ottawa, Ont. An authorized tire dealer must make the best possible use of tires and tubes which can be made fit for further use on the road, must resell those in good condition, must repair and resell those which can be made safe for operation, but is allowed to sell to another authorized dealer for repair and resale a tire which he does not want to repair himself. All tires or tubes which cannot be sold or repaired for sale to a vehicle owner must be disposed of to a salvage collector such as a local branch of the National Salvage Committee or sold to a scrap dealer.

No new tires or tubes will be permitted for buses unless the operator has first obtained an approval from the transit controller.

Spare tires whether new, retreaded, or used, cannot legally be purchased for vehicles which ordinarily do not carry a spare or which are not designed to carry a spare.

If police or fire chiefs use their official cars for pleasure, they will lose the right to purchase new tires and tubes for those cars. Supplies Controller Alan H. Williamson has issued an order permitting national output of bicycles at 150,000 machines in 1942, representing 150% of 1941 production. The same order prohibits manufacture of children's bicycles, limits adult machines to three sizes and eliminates all unnecessary parts and trimmings in the new adult models.

New Tariff Rulings

Permits are now required for the importation of rubber and rubber goods into Canada, the Customs Division of the National Revenue Department has announced. Simultaneously tariff changes for rubber goods have been made public. The import permit requirements apply to all forms of crude rubber and include liquid latex not compounded beyond the addition of a preservative, and unmanufactured balata, gutta percha, and guayule. The rubber products under the order include those made from the specified types of rubber and from scrap or reclaimed rubber. No permit is required for shipments with a value of less than $5.

A Canadian order in council of May 19, 1942, removes specified import duties and taxes from crude and unmanufactured rubber, including latex, tariff items 616 (i) and 616 (iii), irrespective of origin, effective from January 2, 1942, according to Customs Memorandum Series D No. 47 of May 22, Ottawa. The effect of the order is to remove the duty of 5% ad valorem under the intermediate and general tariffs, and to cancel the 10% ad valorem war exchange tax on "rubber, crude, caoutchouc or India-rubber, unmanufactured, not otherwise provided for" (item 616, subitem [i]); to cancel the 10% war exchange tax on "latex, being crude natural rubber in liquid form, not compounded beyond the addition of preservatives" (item 616, subitem (iii) already free of duty from all countries; and to remove the special excise tax of 3% previously applying only to the general tariff under subitems 616 (i) and 616 (iii). Such imports under the British Preferential tariff were already exempt from the import duty and taxes.

Goodrich News

B. F. Goodrich Co. of Canada, Ltd., Kitchener, Ont., will soon be completely out of debt, it would appear from progress being made in redeeming the two bond issues the company inherited from the old Ames Holden Tire & Rubber Co. and the former Canadian Goodrich Co. The 7% first mortgage bond issue, due January 1, 1943, was reduced to $27,500 on December 31, 1941, and completion of sinking fund operations on May 1 further reduced this to $3,600. In 1940 the company had $1,048,600 in 7% cumulative income second mortgage bonds of Ames Holden. But in December, 1940, about $999,000 of this issue was redeemed, and since then the company has made further redemptions until only $37,673 remained the end of May, 1942. In March, Goodrich paid the regular 3½% semi-annual interest on this income bond issue and also paid 62¼% on arrears of interest, eliminating all accumulations. This will leave, except for the small remainder of the two bond issues, only the common stock, of which 85,885 shares are outstanding at latest available date. Most of this is held by the parent company, The B. F. Goodrich Co., Akron, O., U. S. A.

Canadian Goodrich soon will issue a third house magazine, "Footnotes," to be devoted to the footwear trade. J. G. Hagey, advertising manager, stated that the new publication is designed to keep the door open for the future when the company will again have rubber footwear to sell. Meantime the company will pass along sales-help ideas for shoe merchants selling leather footwear.

"Advertising to Help Win the War" was the subject of a series of meetings early in June in Toronto, Ont., and among the discussion leaders was Mr. Hagey.

G. G. Armstrong, Goodrich controller, addressed the recent convention of the Canadian Credit Men's Trust Association, Ltd.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., has produced a new film, "Rubber Lends Wings to Victory", showing the important place rubber takes in defense industries and at the front.

Sydney R. Skelton, Goodyear advertising manager, has been made an officer of the Toronto Advertising Sales Club.

R. C. Berkinshaw, chairman of the Wartime Industries War Control Board and former director-general of the priorities branch, has been given additional responsibilities and is now assistant in charge of industrial controls. Mr. Berkinshaw transferred to the government in February, 1941, from Goodyear Tire & Rubber Co., Ltd., New Toronto, Ont., of which he is general manager and treasurer.

Outlook for Tires

Alan H. Williamson, supplies controller, told the Canadian Transit Association in Toronto, Ont., June 15, that at least 150,000 Canadian passenger cars will be off the road by June 1943. He also predicted that a year from now: The oil shortage may be so serious that pleasure travel will be a thing of the past and all ideas of essential transit may be outmoded; some railway rolling stock will no longer be serviceable; and the rubber shortage will be so acute that tire repairs may be placed on a priority basis.

In another report Mr. Williamson estimated that fewer than one out of every 16 passenger cars in the Dominion will be permitted new tires and tubes during the next two years, during which only about 75,000 essential automobiles can be supplied; while of the remaining 1,175,000 cars about 800,000 will not be allowed tires of any kind. The balance of 375,000 passenger cars are those in Classes B and C. The higher of these two groups may be able to buy some retreaded tires or have some of their own tires retreaded. The lowest eligible group will have to get along with any used tires that may be available. Truck tires are still being manufactured on a 25% quota basis. Stocks of such tires on hand plus this small output should keep about half of Canada's 250,000 trucks in operation for two years. Home delivery vehicles will get none of these new tires, and preference will be given to trucks of the largest types. There may not be enough camelback for the vehicles in the most preferred class. Class B owners will find it difficult, if not impossible, to purchase retreaded tires or retreading services. Good-quality second-hand tires have been scarce, but some will become available when owners lay up their cars for lack of sufficient tires. No one is required to turn in surplus tires, but it is the patriotic duty of every car owner to sell to an authorized dealer any he has left when he can no longer drive his car.

To those who believe that synthetic rubber production is the answer to all these problems, Mr. Williamson advised "that synthetic rubber will not be produced for very many months, and then every ounce will be required for war purposes."

WPTB News

The Wartime Prices and Trade Board, Ottawa, Ont., announced June 15 an order limiting the quantity of elastic webbing or cord which may be used in suspenders.

The Board has also ruled that the retail ceiling of rubber footwear prices for the coming season must not be pierced. List prices remain unchanged, but manufacturers are permitted some adjustment of discounts to large buyers.

Some relaxation of the tire rationing regulations which froze all tires left at dealers to be recapped or retreaded prior to May 15 and on which delivery had not been made has been announced by the Montreal WPTB offices. Thus any tires that were buffed and had the camelback applied before May 15 can be reclaimed by the owner on receiving a permit from the tire rationing representative whether he comes

within a category eligible for retreaded tires or not. Previously it was ruled that a person not eligible for a retreaded or recapped tire could not take delivery, but had to sell the tire to the dealer. Any motorist who left a tire to be retreaded prior to May 15 and on which no work has been done can now reclaim his tire.

E. Alphonse Lalonde, recently appointed tire rationing representative for the territory administered from the regional offices in Montreal, has had 25 years experience in selling rubber products, and lately was Montreal sales representative of the Dominion Rubber Co., Ltd., Montreal, P. Q.

T. M. Mayberry, treasurer, Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., has been elected president of the Advertising & Sales Club of Hamilton.

FINANCIAL

Jenkins Bros., Bridgeport, Conn. For 1941: net income, $492,593, equal after preferred dividends, to $3.56 each on 126,372 common shares, against $345,783, or $2.40 each on 126,568 common shares, in 1940; net sales, $8,813,253, compared with $4,272,281.

Lee Rubber & Tire Corp., Conshohocken, Pa. Six months to April 30: net profit, $598,364, equal to $2.48 each on 241,509 capital shares, against $450,704, or $1.68 each on 268,343 shares for the six months ended April 30, 1941; net sales, $7,967,972, against $7,210,998.

National-Erie Corp., Erie, Pa. For 1941: net profit, $275,690, against $144,999 in 1940.

Rome Cable Corp., Rome, N. Y. Year to March 31: net profit, after $170,000 reserve against future price decline in copper and for other contingencies, $431,165, equal to $2.27 each on 189,830 shares, against $385,460, or $2.03 a share, after $40,000 reserve against price decline in copper, in the preceding fiscal year; current assets, $2,847,912; current liabilities, $533,468.

United Shoe Machinery Corp., Boston, Mass., and associated companies. Year ended February 28: net income, after taxes, $9,771,027.08, equal, after preferred dividend requirements, to $4.08 a common share, against $8,204,130.41, or $3.40 a common share, in the preceding fiscal year; provision for taxes, $9,050,858.13, against $5,745,030.37.

S. S. White Dental Mfg. Co., Philadelphia, Pa., and subsidiaries. March quarter: net profit, $128,686, equal to 43¢ each on 298,898 common shares, against $127,636, or 43¢ each on 294,230 shares, in the 1941 period.

FROM OUR COLUMNS

50 Years Ago—July, 1892

The wire made for the National India-Rubber Co. is of pure Para and Lake copper. The rubber covering is first pressed around the wire in a semi-plastic form, making a seamless covering. It is then wound with a rubber tape and covered with a braided weatherproof outer envelope. These wires are largely used in the New York City subways. (p. xx)

It is put forward by the majority of firms that cold cured goods do not stand hot or cold climates so well as could be desired, the strong light, combined with the heat and perspiration from the body, exerting a powerful decomposing action in hot climates. The light is, I think, the chief agent in bringing about the mischief. (p. 292)

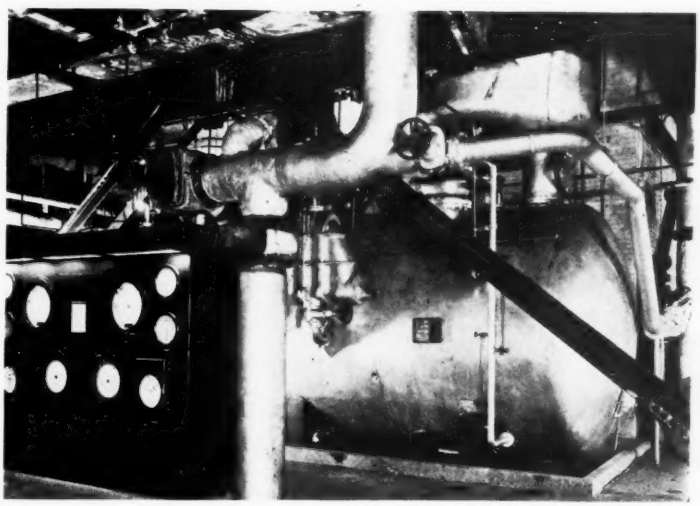
The ideal drying room should have near the floor a small scoopblade fan. This may be speeded so as to draw out all the heavy moist air which lies near the bottom of the room, and leave the hot air above. If this is done the rubber will dry very much quicker, and instead of costing more, the fan largely reduces the cost of the drying room. (p. 312)

25 Years Ago—July, 1917

Announcement has been made that the Aircraft Production Board, under the direction of Howard E. Coffin, is to construct 3,500 war planes, and that the output will be at least doubled next year. (p. 576)

The addition of 0.3 to 0.5% of nitrosobase [para-nitrosodimethlyaniline] to any mixing of a good quality is sufficient to reduce the time of vulcanization from ¼ to ⅛ of that normally required. . . The presence of litharge in any quantity tends to diminish the effectiveness of the organic accelerator. The presence of a small quantity of magnesia augments very considerably the accelerating power of the nitrosobase, and by using the two substances in suitable proportions it is possible to prepare high class mixings which will vulcanize perfectly in about ⅛ the normal time, or about 10 minutes. It is to be noted that the maximum accelerating power of p-nitrosodimethylaniline is only fully manifested when new rubber is used; with reclaimed rubber or rubber waste the results obtained are not very satisfactory. (p. 580)

It is not possible at present to suggest a method of obtaining rubber with a uniform rate of cure, as samples made under exactly similar conditions at different times vary considerably in this respect. The bulking of the product obtained over a considerable period would appear to be the only practicable way of approximating to this result, until further research has thrown more light on the fundamental condition in rubber which influences rate of cure. (p. 581)

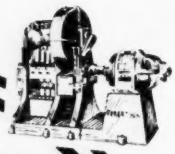


The storage tank for the deaerated boiler feed of this atomizing deaerator unit is back of the panel board. The two atomizing units are immediately above. The four mechanical flow meters on the panel board measure heating steam and feed water flow.

Atomizing Deaerator

CORROSIVE and encrusting water supplies may be treated by an atomizing deaerator which sprays the water and atomizes it with a steam jet to remove residual traces of oxygen. The deaerator does not contain trays which may be fouled by turbid water of high carbonate hardness. It is recommended for treating such water as well as for water which is high in carbon dioxide content and low in pH value and causes rapid deterioration of cast-iron trays in tray-type deaerators. Cochrane Corp.

Hose and Cable Lead Encasing Presses

High Pressure Hydraulic Pump


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ALL Types of lead encasing machinery for rubber hose and electrical cable manufacturers, including Extrusion Presses, Hydraulic Pumps, Melting Furnaces and Pots, Dies and Cores, Hydro-pneumatic Accumulators and Lead Sheath Stripping Machines.

LATIN AMERICA

BRAZIL

Increased Manufacture of Rubber Goods

Brazil has considerably increased the manufacture of rubber goods during the past year, particularly of tires, tubes, and rubber insulated cables. While production totaled 6,592,269 kilograms in 1940, it soared to 11,635,625 kilograms in 1941. A certain part of this output is exported to various South American countries and some to Portugal. In 1941 Brazil shipped to that country 34,280 kilograms of tires and 2,732 kilograms of inner tubes; the tires represented almost 40% of the total exports of manufactured goods to Portugal. Other rubber goods sent there were 1,312 kilograms of rubber sheets, with or without fabric inserts, and 9,000 kilograms of fine Para and 5,040 kilograms of crepe.

Higher Prices Needed to Stimulate Production

Locally it is felt that the output from the Amazon territory could be almost doubled if suitable measures were adopted, as, for instance, guarantee of minimum purchasing prices by the foreign countries interested; guarantee of price for an extended period; organization of producers so as to participate in the gross profits; and improvement of sanitary conditions of laborers.

Although the present price is the highest in several years, it is considered not enough to attract new hands from other parts of Brazil to the rubber regions. Although there are sufficient reserves of rubber in the interior to double output under proper exploitation conditions, it will require a sufficiently high monetary inducement to bring it out.

Prices have increased from an average of 4.80 milreis per kilogram in 1939, to 6.5 milreis in 1940, and 8.5 milreis in 1941. Exports meantime have decreased from 11,805 tons in 1939 to 10,734 tons in 1941.

New Industry Possible

The war in the Pacific is centering American attention on Brazil not only as a source of rubber, but also for other products, including cashew-nutshell oil, now bought chiefly from India. While the United States Government has restricted the importation of the cashew nuts themselves, the demand for the oil from the shells is greater than ever as it is a valuable war material used for insulation materials, plastics, paints, varnishes, as pigment, in the paper industry, etc. It is of interest to the rubber industry as an ingredient used in preparing hard and semi-hard rubber with improved heat and oil resistance and as an aid in plasticizing synthetic rubber.

DOMINICAN REPUBLIC

R. Donatello Herrera, agronomist in charge of the agricultural technical service, Department of Agriculture, Industry, and Labor, Cuidad Trujillo, recently reported that no wild rubber is found in the Dominican Republic. There are, however, three types of rubber in the country in quantities not exceeding 500 trees of each variety, in the following places, and under cultivation, but not as yet exploited: 300 *Hevea brasiliensis* trees on the Maimon estate; 350 *Funtumia elastica trees* (Lagos silk rubber) in San Francisco de Macoris; and 400 tappable *Castilloa elastica* trees in Imbert and Luperon.

The first group was established as an experiment by The B. F. Goodrich Co., and the trees have been tapped for scientific purposes only. The second group is a rubber very rare in this hemisphere, and it as well as the third group will be tapped soon, for the first time, on the initiative of the Department of Agriculture.

One of To-day's Vital Needs Is to Extend Supplies of Rubber and Latex

Vulgum Resins—Solid Extenders for Crude, Reclaim, Synthetics

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Resin and Lacquer Emulsions

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A Few of Our Products of Interest to the Rubber Industry

•

ALKYD 17-B A permanently tacky, alkyd type resin emulsion containing 40% solids. When mixed in equal proportions with normal latex, the mixture for all practical adhesive purposes is indistinguishable from latex.

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EMULSION 58-8 A series of emulsified elastomers containing up to 65% solids. Recommended for use as full latex replacements in impregnation and combining.

PIGMENT BASES Concentrated aqueous dispersions of pigments in resin bases, available in all shades and viscosities, suitable for spreading, spraying, etc.

Also Acrylic, Vinyl, Maleic, Phenolic, Hydrocarbon, Ethyl Cellulose, Cellulose Acetate and Nitrate emulsions and solutions for various applications.

Resin and Lacquer Emulsions have been finding an ever-widening use in many industries. They have proved invaluable in replacing other materials in adhesives, modifiers, binders and fillers, grease proofing, waterproofing, sizing, impregnating, coating, color dispersions and innumerable other uses.

In the Rubber Industry these emulsions are being used today as *Latex Modifiers* and *Complete Latex Replacements* to extend, thicken, stabilize, increase penetration, improve resistance to acids, oils and solvents; *in Coatings* to produce adherent pigmented or clear coatings on paper, fabric, and rubber and as intermediate coats for lacquer on rubberized cloth; in *Rubberizing* textiles; in *Latex Treated Papers* to increase strength and improve ageing; in *Adhesives*, for paper, for leather to cloth, and cloth to cloth.

These are just a few of the known applications in the rubber field. Undoubtedly in your own plant you will find many uses for these emulsions to improve your products and extend the supply of the vital materials, LATEX, RECLAIMS, and SYNTHETICS.

Our Technical Staff will be glad to make recommendations to meet your specific problems. Write today for additional information.

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Tire Brand, 99½% Pure

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424 OHIO BUILDING, AKRON, OHIO
FREEPORT, TEXAS APOPKA, FLORIDA

As many manufacturers in the country use rubber, the scant output of these trees will leave no margin for export, but will be utilized for local needs.

ECUADOR

The demand for rubber by Argentina and other South and Central American countries has sent the price of crude rubber soaring in Ecuador in the last few months. Since Ecuador has a rainy season lasting usually from late December to June, during which the collection of rubber is limited, it is not possible yet to gage the effect of the high prices on rubber production. Comparative figures for the first quarters of 1941 and 1942 do show some increase; the respective amounts were 321,378 kilograms and 354,302 kilograms.

URUGUAY

S. Rivas Costa, acting consul general in New York, informs us that Montevideo reports that no cultivation of industrial plants for the extraction of rubber is acually being carried on in Uruguay. However the Fábrica N. de Neumáticos "Funsa", a rubber tire manufacturer, plans an experimental cultivation of a species of *Ficus*, having requested seeds from the United States.

EUROPE

GREAT BRITAIN

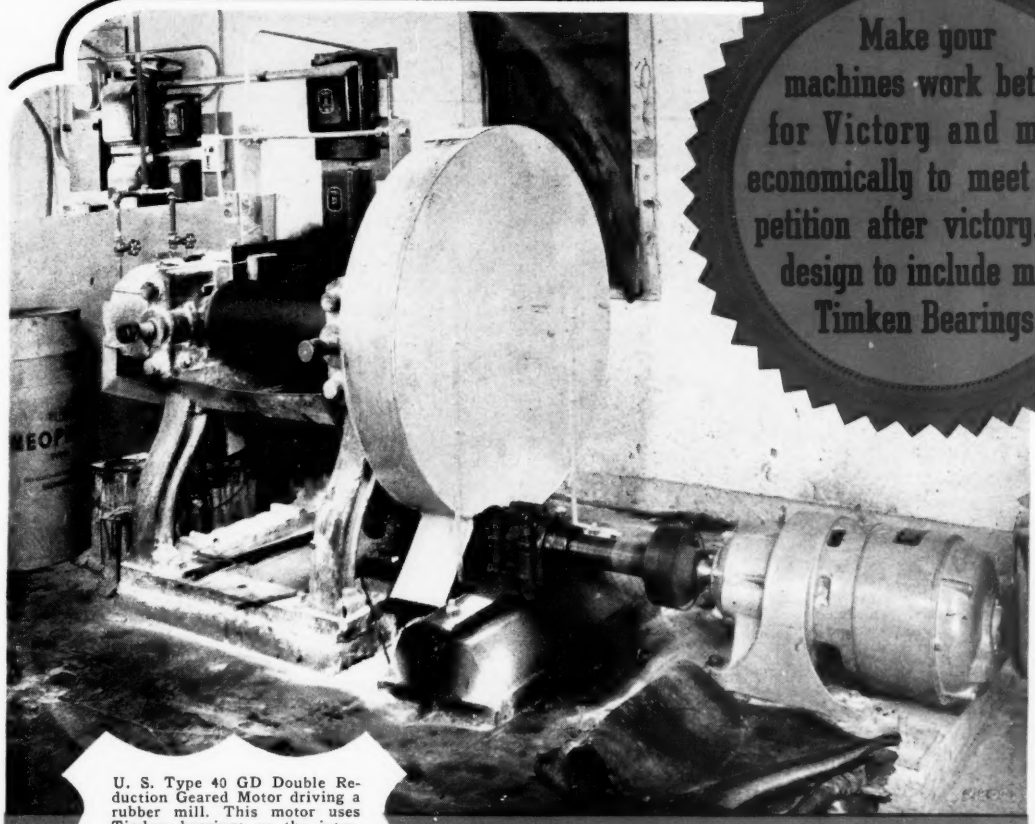
New Rubber Organization

The proposal to form a Federation of British Rubber & Allied Manufacturers' Associations, mentioned in these columns last month, received such strong support that it could be quickly carried into effect. The following associations agreed to join: Mechanical Association, Wrapped Hose Association, All Rubber Hose Association, Molded Hose Association, Belting Association, Football Bladder Association, Hot Water Bottle Association, Surgical Association, Flooring Association, Ebonite Association, English India Rubber Thread Association, Retread Manufacturers' Association, Rubber Reclaimers' Association, Rubber Shoe Manufacturers' of Great Britain, Rubber Proofers' Association, Rubber Latex Manufacturers' Association, and Tire Manufacturers Conference.

Almost as soon as it was formed, the new organization was requested by the Board of Trade to offer proposals for the concentration of the rubber industry.

In a letter in a recent issue of the London *Rubber Age*, L. V. Kenward, chairman of India Rubber Manufacturers' Association, Ltd., had already suggested that the rubber industry would soon be asked to take this step, and he pointed to the double need of concentration—the national need and that of the individual manufacturer whose output included various lines impossible to produce efficiently on the amounts of rubber allocated for the purpose. Voluntary concentration, he explained, would give quicker and better results than any official scheme which would first have to be worked out, and he therefore advised the manufacturers in the position described to get in touch with other manufacturers similarly situated with a view to making some individual bargains which, if the Board of Trade approved, could be adopted without delay.

Make your machines work better for Victory and more economically to meet competition after victory. Redesign to include more Timken Bearings.



U. S. Type 40 GD Double Reduction Geared Motor driving a rubber mill. This motor uses Timken bearings on the intermediate shaft. Manufactured by U. S. Electrical Motors, Inc., Los Angeles, California; Milford, Connecticut.

Rubber processing machinery is being driven to the limit of its capacity to keep up with the war program. That means more friction, more wear and greatly increased maintenance time wherever rotating parts are not properly protected.

Equipment containing Timken Tapered Roller Bearings operates smoother and faster, is more dependable and possesses greater endurance. For Timken Bearings eliminate friction; prevent wear; safely carry all radial, thrust and combined loads; and hold moving parts in constant alignment.

There is no reason why any kind of rubber processing equipment —including mills—should not have the benefits of Timken Bearings. It is to your advantage to make sure your new machines have them and to see whether Timken Bearings can be applied to existing equipment. Consult the machine builder or our engineers.

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Reforming or Reclaiming

The advantages, under present conditions, of partially substituting reclaiming by reforming, that is directly producing molded articles from ground vulcanized rubber by applying heat and pressure, have lately been considered by *India Rubber Journal*. Henry P. Stevens started the discussion when he wrote a letter in which he recalled a reference to the subject by F. H. Cotton in his paper on "Rational Processing."[1] Mr. Cotton said in this connection that he believed that rubber heels were made by the reforming process in Spain.

Dr. Stevens mentioned the existence in England of a small factory which made goods in this way some years ago, but the products were easily abraded, and the adhesion between the particles of ground rubber was small so that on swelling in benzine the mass disintegrated and the particles separated. Under present circumstances, however, he felt that it might be worth while to see if some modification or addition, or the use of greater pressure or temperature would give satisfactory products without the use of new rubber.

The question was immediately taken up by P. Schidrowitz in his "Views and Reviews." He quoted from his book, "Rubber", first published in 1911, in which he had referred to various patents taken out for such processes by Gare, Immisch, and others and the "exceedingly good results obtainable." The original Gare process, said Dr. Schidrowitz, consisted roughly of molding under pressure in very heavy molds, then clamping the mold head or plunger, heating, and finally applying further pressure to take up the slack, relocking, and reheating. In this way even very massive articles, such as buffers of excellent quality, were produced. Subsequently Gare modified and simplified his process and was able to produce solid tires and small articles.

At the time this process was evolved, crude rubber prices were very high, and it was then considered that reforming was cheaper for certain goods than making them of raw rubber; this point no longer held when prices began to decline. Today the subject is again of interest for certain lines of goods. Dr. Schidrowitz doubts that increased pressure and temperature are the best type of improvement to consider, for both involve the use of very massive molds, which means the use of much valuable material. He prefers Dr. Stevens' idea of modification or addition, for instance, "the softening and subsequent cohesion of the ground waste particles might be facilitated by the addition of a thermosetting synthetic resin powder, or of the same in emulsion or solution, by spraying and subsequent drying."

However the determining factor in deciding whether reforming is, for certain goods at any rate, preferable to reclaiming is the relation of the existing reclaiming capacity to available waste. If the former is inadequate and is not likely to be substantially increased in the near future, then a modification of the reforming process might be worth most careful consideration. Perhaps some simple modification might be discovered which any manufacturer could apply and which would not require a special factory or department.

Dr. Stevens' letter also brought a note from Hazel Grove Rubber Co., Ltd., Stockport, which states that this company has for the past 30 years been using a process of reclaiming waste rubber without the addition of new crude rubber. The company claims to be able to reproduce qualities almost identical to the original rubber.

[1] *Trans. Inst. Rubber Ind.*, Apr., 1941, p. 321.

The Emergency Reclaim Plan

In a second installment of the "*Rubber Age* Emergency Reclaim Plan",[1] F. W. Pickett describes suitable methods of collecting and treating scrap rubber preparatory to shipping to reclaimers. Most of the waste rubber is collected in the south of England; while the reclaiming plants are in the north. Their bulk and shape make old tires very difficult to pack in any kind of vehicle; furthermore rubber forms only a comparatively small proportion of old tires. Transportation charges, therefore, are serious factors in costs and must be kept as low as possible.

The author suggests that depots for collecting old tires be opened near populous centers, where the tires would be debeaded and

[1] May, 1942, p. 57.

stripped before being sent to the reclaimers. He describes the simple and inexpensive method of stripping the rubber from the carcass that he himself devised. About four cuts are made in the tread and sidewall rubber circumferentially, deep enough to reach, but not cut the fabric casing. The tire is then immersed into water at or about boiling point for one hour, then it is removed, mounted on a kind of mandrel when the rubber can easily be stripped from the casing by pulling. Mr. Pickett has found that experienced workers can strip up to 30 tires an hour. The flat rubber thus obtained can then be wired into bundles and shipped to the reclaiming factory where it requires no preliminary treatment before softening.

To carry this plan out, the depots require only a few tanks, which may be of concrete, and a circulating system of hot water from a small boiler outside; also a few mandrels to hold the tires during stripping.

When this method was first put into effect a few years ago, the stripped casings were generally used as foundation material for rubber soles and heels as well as for tiles.

Another way of collecting scrap for the reclaimer is to remove tread and sidewall rubber in the form of crumbs. This work can be done by mounting the old tire on a three-jaw, expansion chuck and holding a "grater" against the revolving cover. Crumb rubber thus obtained must be thoroughly cooled and dried before shipping; otherwise danger of spontaneous combustion exists.

The foregoing methods of stripping and grating rubber are suggested for small-scale and improvised war-time work, as they are cheap, easily and quickly installed, and adequate. For large-scale work the machinery developed by the retreading trade for stripping treads from casings and for removing rubber by rasping would, of course, be used.

SWITZERLAND

In Switzerland experiments have been carried out with a synthetic rubber said to be produced from charcoal or the by-products of gas manufacture, which apparently has given results sufficiently encouraging to warrant its manufacture on a commercial scale. Reports indicate that a factory with an area of 1,000 square meters is to be built near Zurich.

So far the value of the new material has been tested in bicycle tires and insulating materials, and it is claimed that the Swiss product has been found to be resistant to oil and gasoline and to have insulating properties superior to those of natural rubber.

IT'S DUCK SOUP TO PREVENT SCORCHING

It is only a matter of carefully following directions, especially as to temperature, during each process. With the *Cambridge* Pyrometer, temperature determination of rolls, molds and rubber in the mass are simple matters. This rugged, quick-acting instrument is so convenient to use that the men *will* use it.

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FAR EAST

CEYLON

Potentialities as a Rubber Producer

As the last remaining Far Eastern source of rubber left to the Allies, Ceylon is being urged more strongly than ever to increase outputs to the utmost. Before Pearl Harbor there was reason to be dissatisfied with Ceylon's output, and at the time the Rubber Controller hinted that legal steps might be taken to make planters see the light. Now, however, the Ministry of Supply has announced that it will pay a cash bonus of 30 cents a pound to Ceylon producers on each pound of rubber produced over 90% of standard production and 60 cents for each pound over 100%.

What are Ceylon's potentialities as a rubber producer?

According to the Administration Report of the Rubber Controller for the year ending December, 1940, the acreage under rubber was 603,747 acres plus nurseries and experimental plots 1934-1940, aggregating 393 acres, and new planting in 1939 and 1940 tentatively put at 35,077 acres—in all 639,217 acres.

Of the above 603,747 acres, all but about 26,700 acres (replanted after the introduction of restriction and for which no adjustment was made in the statistics) were planted before 1935. So that practically the entire area is tappable; indeed 461,369 acres were planted before 1922; 9,536 acres are 19 to 20 years old; 10,895 acres were planted from 1924 to 1929; 11,008 acres are from nine to 12 years old, and 12,929 acres are around eight years old.

More than half the acreage is made up of estates of 100 acres and over; their assessed yield per acre in 1940 was 450 pounds. The rest consists of small estates from 10 to 100 acres, assessed at 354 pounds per acre, and small holdings under 10 acres, with estimated yield of 314 pounds per acre. The average output per acre for the whole area was put at 402 pounds.

As Ceylon has been rather backward in regard to bud-grafting, at the end of 1940 only about 30,000 acres were budded, or less than 5% of the total acreage, and only 3,045 acres had reached tapping age. Of the total, 8,050 acres were budded in 1939 and 1940, and in the same years 5,063 acres were also planted with clonal seed.

Standard production for 1940 was fixed at 107,000 tons, and while the exportable allowance for the year averaged 83¾%, the exportable maximum was locally fixed at 82½%. Net exports for the year were 88,413 tons. The standard production was put at 109,000 tons in 1941, and the permissible exportable amount was 114,450 tons. There are no figures of Ceylon exports available later than the end of November, 1941, and from January, 1941, to that date, the permissible exports were 103,550 tons, but actual net exports for the period were only 81,603 tons.

The reason why Ceylon was not able to make her quota is said to be the withdrawal for military service of a large number of supervisors without whose careful direction and close inspection increased yields are hard to secure from Ceylon's areas of which so large a part is old and in only too many cases also worked out.

To Obtain Greater Yields

Ceylon's quota for 1942 at 120% is 130,400 tons; if she exported around 90,000 tons in 1941, it means she is required to increase her exports by roughly 45% in 1942. And now the Rubber Research Scheme of Ceylon has sent a circular to advise rubber growers how to achieve this, or at least attempt to do it.

Since Ceylon has no untapped reserves such as would only require the stimulus of a good price to be exploited, if more rubber is to be produced, every operation must be carefully scrutinized to see if there is room for some modification by which outputs could be increased without serious damage to the tree. Thus if tapping has hitherto been on the shallow side, output will immediately increase if the cut is made deeper, but care must be taken not to wound the tree; all scrap on the trees and ground, formerly neglected, must now be collected. The yield of seedling trees increases when the height of the tapping cut decreases; so additional

crop can be obtained by tapping only the lower panels, for as long as this is possible (later on when the higher panels have to be tapped, there will be a drop in output). Also recommended are setting the best tappers to work on the highest yielders, curtailing the usual rest period during refoliation after the annual wintering of the trees, tapping budded areas when only 60% instead of 75% of trees have attained the minimum girth of 20 inches at a height of 36 inches from the union, manuring to increase the vigor of the trees, and abstaining from replanting.

But before all of these should be placed suitable modification of tapping systems. The circular recommends that estates that have hitherto followed mild systems of less than 100% intensity should now adopt the latter; and on estates in the wetter low-country districts which have satisfactory bark reserves, the temporary adoption of double-three tapping, that is, two opposite half-spiral cuts every three days, is advocated. The intensity of this system is 133%, or 33% greater than the normal one-half spiral cut on alternate days; theoretically the double-three should yield 33% more crop, but this yield has never been achieved. At Dartonfield estate, where experiments were conducted with this system under very good conditions, the increase over a period of four years was 17%.

It will be noted that the double-three cut is recommended for temporary adoption only, for even this system causes a marked increase in Brown Bast. At Dartonfield the incidence with this method was 7.8%, against 3.3% with the one-half spiral cut on alternate days (100% intensity). No system of greater intensity than the latter is advised on buddings or high-yielding seedlings.

More drastic methods have been used on ordinary seedlings, but usually only when a replanting program was under way and the trees were destined to be cut out in a year or so. With these systems 50 to 60% increases in crop have been reported, but trees are usually permanently injured; many go dry in a few months, and the dry rubber content of the latex of these areas drops considerably. Such methods of slaughter tapping, as they are named, are not likely to be employed except in extreme emergency.

INDIA

Hevea is grown in southern India chiefly in the States of Travancore and Cochin and to some extent in the Madras Presidency. The area under rubber totals 136,000 acres, which are expected to yield 16,000 long tons in the current year. Besides *Hevea* there are some abandoned *Ceara* plantations, and it is thought that an additional 500 long tons could be obtained from these. India is considered capable of also producing about 5,000 tons of reclaim annually from old tires.

In the fiscal year ended March 31, 1940, India exported 21,543,899 pounds of crude rubber, chiefly to the United Kingdom and the United States. At the same time she imported 7,484,644 pounds of crude rubber, practically all from Burma.

NIGERIA

The Nigerian Department of Agriculture is encouraging the production of rubber from certain specified forest trees, and it is hoped that this action in addition to the stimulus of higher prices will raise the output of rubber in 1942 to 8,000,000 pounds. In 1940 exports totaled 6,501,000 pounds, but in 1941 dropped to 4,603,200 pounds. Official estimates indicate that the low 1941 figure is due to the fact that about 2,000,000 pounds of rubber collected during 1941 were carried forward to 1942.

AUSTRALIA

A recent analysis of the rubber manufacturing industry in Australia revealed that for the fiscal year 1939-40 output was valued at £3,089,764. Figures for preceding fiscal years follow: 1938-39, £2,761,075; 1937-38, £2,461,962; 1936-37, £2,303,302; 1920-21, £1,016,000.

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Editor's Book Table

BOOK REVIEWS

"The Vanderbilt Rubber Handbook." Eighth Edition, 1942. Edited by John M. Ball. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. Cloth, 464 pages, 5½ by 8½ inches. Index.

The latest edition of the Vanderbilt handbook is similar in arrangement to the one published in 1936, but much new data have been incorporated, including articles on synthetic and reclaimed rubber and the commercial compounding of various types of rubber goods.

In Section One the compounding of dry and latex rubber is discussed with emphasis on Vanderbilt materials. Section Two comprises a tabular summary of the Vanderbilt line of compounding ingredients for natural, reclaimed, and synthetic rubbers, and latex and rubber dispersions, and their properties and uses. Section Three contains 28 articles and test methods concerned with the processing and technology of rubber. Many of them were written by the foremost authorities in the industry. Section Four provides a variety of tables for handy reference and other information useful in the factory and laboratory.

The Vanderbilt company deserves to be congratulated for publishing this volume at a time when the rubber situation is undergoing decided and far-reaching changes. The technical data collected from many manufacturers merit the careful consideration of rubber chemists and technologists.

"Industrial Chemistry of Colloidal and Amorphous Materials." Warren K. Lewis, Lombard Squires, and Geoffrey Broughton. Published by The Macmillan Co., 60 Fifth Ave., New York, N. Y. 1942. Cloth, 9½ by 6 inches, 540 pages. Photographs, diagrams, and tables. Index. Price $5.50.

This timely textbook, written by three chemical engineers of wide experience, introduces the reader or student to the physical chemistry of colloidal and amorphous materials and emphasizes those phases which are important or which appear to have future importance in industry. The introductory chapters present the basic theories and phenomena governing materials and processes necessary to an understanding of the industrial technology of colloidal and amorphous matter. The interrelations of the amorphous and colloidal states are clearly explained. The reactions observed in colloidal and amorphous systems are presented as the results of the nature and effects of inter-molecular forces and the structure of surfaces of discontinuity.

The latter part of the book describes the methods of utilization of the chemistry of colloidal and amorphous materials in the glass, paper, leather, ceramics, synthetic resins, plastics, plastic and textile fibers, and rubber industries.

In about 50 pages devoted to the rubber industry the molecular structure of rubber as an amorphous solid and the chemical structure of a number of artificial rubbers are discussed. There is generous reference to the literature and pertinent information concerning the chemical and physical properties of rubber; milling, calendering, and molding; the chemistry of reclaimed rubber; the nature and chemical action of accelerators; and the inhibitory action of antioxidants. In a discussion of the methods and problems of vulcanization the theories of molecular action are propounded as well as the mechanisms involved. The physical properties of vulcanizates as altered by fillers and reenforcing agents is also dealt with, as well as the stabilization and manufacture of latex.

Other portions of the book give some attention to the characteristics of rubber gels and cements; the structure and formation of styrene and isobutylene; and catalysis.

"Rationed Rubber and What to Do about It." William Haynes and Ernst A. Hauser. Published by Alfred A. Knopf, Inc., 501 Madison Ave., New York, N. Y. Cloth, 5 by 7¾ inches, 181 pages. Price $1.75.

Any reader will find this objective story of rubber informative and interesting. But for many it will have the fascination of fiction, for the authors have the facility of presenting sound scientific

and economic facts, even hard cold facts, with creative force and narrative technique. More voluminous records of the development of the rubber industry have been written, but this condensed, yet complete, version does not suffer by comparison, for in direct and swiftly flowing chapters, bright with collateral allusion, all the aspects of production, compounding, and processing are told in the most logical sequence. Every significant phase of rubber technology and the present rubber problem is clearly discussed and explained. All the facts of the current crisis are intelligently presented including the stockpile of crude and possible additions to it, future synthetic supplies, and military needs.

"Rationed Rubber" is good reading, instructive and entertaining. When the reader is finished, he will have gained a keen appreciation of the remarkable usefulness of rubber that will likely make him more amenable to the vital necessity of conservation. Mr. Haynes is the author of the current best seller, "This Chemical Age", and Dr. Hauser, long identified with the advance of rubber technology, is associate professor of chemical engineering at the Massachusetts Institute of Technology.

"The Recovery of Vapors." Clark Shove Robinson. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York, N. Y. 1942. Cloth, 9½ by 6 inches, 273 pages. Index. Price $4.75.

The commercial recovery of solvents is of comparatively recent origin, and interest in the subject is increasing as a result of advances in synthetic organic chemistry which have made many new solvents available. Other factors accounting for the expansion in this field are the increased cost of some solvents; the growth of the synthetic rubber, resins, plastics, and lacquers industries; the necessity of reducing production costs; and the dangers of industrial poisoning and fire hazards.

Prefaced by a review of the elementary principles of chemical engineering, this volume presents the basic theory and the fundamental practices involved in the recovery of vapors. It describes adsorption, activated carbon, scrubbing, condensation, and compression and cooling processes, illustrated with numerous examples of each. Factors important in the design of recovery equipment are briefly discussed, and there are descriptions of standard apparatus.

The apparatus for and the method of recovery of rubber solvents by adsorption is summarized. According to the author, 85 to 90% of the solvent used may be recovered by this process, and he suggests its economical features for the recovery of relatively inexpensive rubber solvents. Laboratory apparatus and a method for measuring the rate of evaporation in the drying of thin rubber and other films are given.

NEW PUBLICATIONS

"Neoprene Type FR." Report 42-1. D. F. Fraser. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. May, 1942. 20 pages. This report describes the freeze resistant and other properties of vulcanizates of Neoprene Type FR. A preferred litharge and an alternate magnesia-zinc oxide basic compound are recommended. Graphs and charts show the effects of fillers and softeners with recommendations based on test results.

"The Compounding and Processing of Neoprene Type GN." Report 42-2. N. L. Catton, D. F. Fraser, and D. B. Forman. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. May, 1942. 40 pages. This report revises and brings up to date the material in Report 40-2, issued in April, 1940. There is new matter on processing and on the effect of softeners and fillers in compounding.

"A Plan for the Conservation of Vital War Transportation." Automotive Safety Foundation, Washington, D. C., in cooperation with the Office of Defense Transportation. 20 pages. This folder discusses the objectives of the transportation conservation plan and suggests the methods by which they may be achieved. Photographs and other illustrations picture the problem and its solution as a means of saving rubber and other vital materials.

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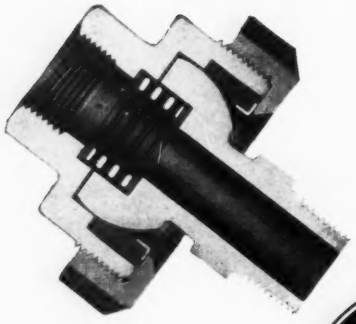

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"Helping Industry Help America." Sun Oil Co., Philadelphia, Pa. 16 pages. This booklet describes the value of lubricants in obtaining maximum factory production. Actual problems, including those of rubber manufacturing plants, are discussed.

"Rubber and Composition Machinery, 1942." Stewart Bolling & Co., Inc., 3190 E. 65th St., Cleveland, O. 1942. 24 pages. This booklet describes and illustrates new designs, adaptations, and improvements of standard models of bale cutters, roll mills, presses, and pumping systems to meet changing requirements of the rubber industry.

"First Aid to Industry." United States Rubber Co., 1230 Sixth Ave., New York, N. Y. 46 pages. This illustrated rubber conservation manual contains explicit suggestions for the care of hose, belting, packings, electrical tapes, wires and cables, molded and extruded goods, rubber-lined equipment, mountings, matting, printing materials, and rubber bonded grinding wheels.

"Industrial Rubber Products Conservation." The Goodyear Tire & Rubber Co., Inc., Akron, O. 40 pages. This illustrated manual relates the proper procedure for installation, inspection, and repair of conveyer, transmission, elevator, and V-belts, belt joining and fastening, hose and hose fittings, and Plioweld.

"Conservation of Vital War Transportation." Division of Local Transport, Office of Defense Transportation, Washington, D. C. 36 pages. This pamphlet, illustrated with charts and graphs, outlines procedures and methods of the organized plan to obtain maximum service from existing private and public transportation facilities.

"Rubber." Charles Kennard. Smith, Barney & Co., 14 Wall St., New York, N. Y. 28 pages. This study of the critical rubber situation in terms of need and likely supplies is presented with clarity and conciseness. Important synthetic types are surveyed with respect to their production and usefulness.

"Industrial Equipment Catalog." S. F. Bowser & Co., Inc., Fort Wayne, Ind. 40 pages. This catalog describes several types of filtering and metering equipment useful to the rubber industry, and other miscellaneous machinery.

"Automobile Transportation in the War Effort." Charles L. Dearing. The Brookings Institution, Washington, D. C. 48 pages. **"Plant Efficiency. Ideas and Suggestions on Increasing Efficiency in Smaller Plants."** Division of Information, WPB, Washington, D. C. 40 pages. **"Handbook of Scientific and Technical Societies and Institutions of the United States and Canada."** Fourth Edition. National Research Council, 2101 Constitution Ave., Washington, D. C. 389 pages; cloth; $4. **"Zinc in War."** New Jersey Zinc Co., 160 Front St., New York, N. Y. 4 pages. **"OEM Handbook, Functions and Administration."** Office for Emergency Management, Washington, D. C. 72 pages. **"Bristol Fully Compensated Liquid-Filled Recording Thermometers."** Bulletin T302. The Bristol Co., Waterbury, Conn. 6 pages.

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Replacements for Latex

(*Continued from page* 346)

(b) All resin-saturated sheets and flexible fiber boards completely free of rubber in any form are in commercial manufacture. Present research involves the use of new types of available resins as prepared by controlled polymerization of drying oils to produce tough rubbery solids, increased extension of vinyl and acrylic polymers with other types of resins to reduce cost and availability, and the co-use of resins and synthetic rubbers where very minor proportions of synthetic rubbers are being found to confer marked improvement upon the resins which, by themselves, are not sufficiently suitable. Progress in this research will be reported in a future publication.

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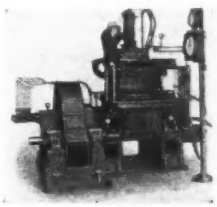

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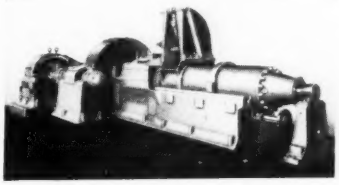

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APPLICATION

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22,086. (Reissue.) **Bushing with Compressible Sealing Gasket.** E. D. Treanor, Pittsfield, Mass., assignor to General Electric Co., a corporation of N. Y.

2,274,747. **Cushioned Handle Bar** for Bicycles. F. W. Schwinn, Chicago, Ill.

2,274,764. **Thrust Bearing** Having Resilient Bearing Pads. L. I. Yeomans, Chicago, Ill., assignor to F. W. Bliss Co., Brooklyn, N. Y.

2,274,839. **Electrically Heated Hose** Consisting of a Strip of Sheet Material Confined between Two Layers along the Hose and Treated with Electrically Conductive Rubber and Having Current Supply Wires Secured along the Side Edges of the Strip and Adapted When a Different Electric Potential Is Maintained between the Wires to Cause Current to Flow across the Strip and Heat the Hose. L. Marick, Grosse Pointe Farms, Mich., assignor to United States Rubber Co., New York, N. Y.

2,274,840. **Electrically Conductive Fabric** Containing Non-Metallic Threads Treated with a Current-Conducting Non-Metallic Plastic Material. L. Marick, Grosse Pointe Farms, and J. Schreiber, Detroit, both in Mich., assignors to United States Rubber Co., New York, N. Y.

2,274,855. **Tire** with Tread Portion Containing a Quantity of Water Soluble Inorganic Halide Salt Interspersed therethrough. E. H. Wallace, Detroit, Mich., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,274,882. **Telescopic Vehicle Antenna** with Insulating Material in the Reel Inner Casing. L. S. Brach, East Orange, assignor to L. S. Brach Mfg. Corp., Newark, both in N. J.

2,274,884. **Hollow Insulator Mounting Means** for Vehicle Antennas. L. S. Brach, East Orange, assignor to L. S. Brach Mfg. Corp., Newark, both in N. J.

2,274,912. **Garters** Including Straps to Pass over the Wearer's Shoulders. E. M. Tompsett, Bloomfield, Nebr.

2,274,918. **Rubber Sheathed Carrying Iron.** J. C. Chenette, Flat Rock, Mich.

2,274,940. **Squeeze Cementing of Wells** Utilizing Packing Adapted to Shear under Stress. A. D. Stoddard, assignor to Halliburton Oil Well Cementing Co., both of Duncan, Okla.

2,275,035. **Roller Skate** with Resilient Cushioning Parts. E. J. Pardon, assignor to Union Hardware Co., both of Torrington, Conn.

2,275,081. **Molded Plastic Inner Tube Valve Stem.** C. E. Maynard, Northampton, Mass., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,275,085. **Gasket Material** Comprising a Fabric Woven from Metallic Wool and Flat Strands of Thin Metal, the Fabric Having Its Pores filled with a Solid Flexible Binding Agent. K. Michel, Stuttgart-Hofen, and E. Hutzenlaub, Stuttgart, both in Germany.

2,275,152. **Spring Suspension Assembly** Containing Rubber-Bonded-to-Metal Plates. J. Ledwinka, assignor to Edward G. Budd Mfg. Co., both of Philadelphia, Pa.

2,275,206. **Inflatable Boxing Glove.** F. H. Sutherland, Five Dock, N. S. W., Australia.

2,275,214. **Replaceable Shoe Heel.** O. Alvistur, San Francisco, Calif.

2,275,235. **Container Seal** with Gasket Ring of Vulcanized Sponge Rubber Covered with a Ring of Non-Adhesive Plastic Compound. D. L. Shanklin and W. C. Ross, Winchester, assignors to Dewey & Almy Chemical Co., North Cambridge, both in Mass.

2,275,248. **Hosiery** Incorporating Elastic Yarn in the Top Selvage. A. N. Cloutier, Lonsdale, assignor to Hemphill Co., Central Falls, Central Falls, both in R. I.

2,275,272. **Curing Concrete** by Applying to the Fresh, Wet Concrete a Solution in a Volatile Solvent of an Unsaponifiable Wax of a Synthetic Resin (Copolymers of Vinyl Acetate and Vinyl Chloride, Rubber Hydrochloride, Rubber Chloride, or the Reaction Product of a Metal Chloride and Rubber). Evaporating the Solvent to Form a Water-Impermeable Layer to Retard Evaporation of Water from the Concrete. E. W. Scripture, Jr., Shaker Heights, O.

2,275,289. **Transparent Flexible Crease-Resisting Odorless Sheet Material** Comprising a Cellulose Hydrate Sheet Coated with Layers of Chlorinated Rubber and Chlorinated Paraffin Composition and Composition Selected from Cellulose Esters. E. Czapek, Berlin, Germany, assignor to Guaranty Trust Co. of New York, New York, N. Y.

2,275,299. **Spot Lamp Attachment** with Rubber Suction Cup. R. H. Hummert, assignor to S. H. Thomson Mfg. Co., both of Dayton, O.

2,275,374. **Baseball** Having No Other Cover Than That Consisting of an Undercoating of Opaque, Pervious, Cellular Latex Compound and a Thin Preformed Outer Skin of the Same Compound Enveloping the Undercoating and Thread Covered Core. F. S. de Beer, Albany, N. Y.

2,275,407. **Rubber-Soled Shoe.** E. A. Bickford, assignor to Wiley-Bickford-Sweet Corp., both of Worcester, Mass.

2,275,473. **Electrical Sounding Device** in a Well Cementing Apparatus, Having a Rubber Diaphragm. D. Scaramucci, Norman, assignor to Oil Equipment Engineering Corp., Oklahoma City, both in Okla.

2,275,518. **Highway Marker.** B. K. Frank, Birmingham, H. M. Pryale, Pontiac, and W. C. Smith and W. A. Paxton, Detroit, assignors to Baldwin Rubber Co., Pontiac, all in Mich.

2,275,526. **Battery Non-Overfill Device.** R. H. Hill, Anderson, Ind., assignor to General Motors Corp., Detroit, Mich.

2,275,528. **Foundation Garment.** M. Kah, Cedarhurst, N. Y.

2,275,533. **Christmas Tree Illuminating System.** W. R. Landy, Minneapolis, Minn.

2,275,534. **Anesthetic Administering Apparatus.** A. S. Langsdorf, St. Louis, Mo.

2,275,539. **Telephone Call Indicator** with Glass Bulb Resiliently Spaced from the Housing and Lens. E. C. Matthews, Elizabeth, N. J., assignor to Bell Telephone Laboratories, Inc., New York, N. Y.

2,275,547. **Base Marker** Having Rubber Impregnated Fabric Sheets. W. W. Mouch, Columbus, O.

2,275,550. **Pressure Actuated Switch** with Compressible, Insulating Pad and Diaphragm. O. Rasmussen, Dayton, O., assignor to General Motors Corp., Detroit, Mich.

2,275,575. **Floor Covering Padding** Having Hollow Support Engaging Projections on a Flexible Sheet. W. S. Vrooman, assignor to Baldwin Rubber Co., both of Pontiac, Mich.

2,275,578. **Offset Prevention** Including Spraying the Printed Material with an Aqueous Solution Containing Polyvinyl Alcohol. W. H. Wood, Bedford, assignor to Harris-Seybold-Potter Co., Cleveland, both in O.

2,275,712. **Pressure-Sensitive Diaphragm** in a Pneumatic-Hydraulic Valve. S. J. Zand, Forest Hills, assignor to Sperry Gyroscope Co., Inc., Brooklyn, N. Y., both in N. Y.

2,275,720. **Shoe Outsole** Comprising an Upper Layer of Lightweight Rubber Composition Containing a Vegetable Filler, and a Bottom Layer of Wear-Resisting Rubber Composition. G. H. Bingham, Jr., Lincoln, assignor to Cambridge Rubber Co., Cambridge, both in Mass.

2,275,812. **Preformed Multipane Glazing Unit** with Rubber Blocks Embedded in an Adhesive Plastic Marginal Sealing Strip. H. M. Woelfel, assignor to Robert Mitchell Co., Ltd., both of Montreal, P. Q., Canada.

2,275,820. **Rubber-Bodied Pneumatic Valve** with a Monel Metal Surface Portion. O. W. Hosking, Monroe, N. Y., assignor to Composite Rubber Products Corp., Bridgeport, Conn.

2,276,017. **Rubber-Bodied Electric Cord Plug.** A. Brownstein, Bridgeport, Conn., assignor to Colonial Co., Attleboro, Mass.

2,276,027. **Piston and Resilient Packing Cup.** B. Dick, Ferguson, assignor to Wagner Electric Corp., St. Louis, both in Mo.

2,276,035. **Molded Laminated Articles** Containing Synthetic Resin-Impregnated Fibrous Sheets. H. C. Guhl, Wilkinsburg, assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, both in Pa.

2,276,042. **Wire Rope** with Live Rubber Interposed between Outer Wire Strands Helically Wound around a Yieldable Central Core. E. V. Jacobson, Ironwood, Mich.

2,276,045. **Girdle.** E. D. Kattermann, assignor to Swiss Knitting Co., both of Dover, N. J.

2,276,070. **Friction Element,** Including therein a Multiplicity of Graphite Particles Bonded Together by Rubber. R. E. Spokes, Ann Arbor, Mich., assignor to American Brake Shoe & Foundry Co., New York, N. Y.

2,276,072. **Sportsman's High Waders** with an Inflatable Tube Encircling the Wearer's Waist. C. L. Stokes, Santa Monica, Calif.

2,276,091. **Closure** for Battery Box Covers. R. Reppert, Pelham Manor, assignor to American Hard Rubber Co., New York, both in N. Y.

2,276,092. **Closure** for Battery Box Covers. R. Reppert, Pelham Manor, and R. A. Johnson, Brooklyn, assignors to American Hard Rubber Co., New York, all in N. Y.

2,276,205. **Hinged Covers** for Cooler Cabinets, with Molded Plastic Bottom Wall. H. D. King, Medina, O., assignor to American Hard Rubber Co., New York, N. Y.

2,276,225. **Bearing** with an Annular Oil-Resistant Rubber-Like Sealing Disk. E. R. Carter, assignor to Fafnir Bearing Co., both of New Britain, Conn.

2,276,398. **Tennis Shoe.** C. E. Hosker, Watertown, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

2,276,408. **Yarn Tension Device for Shuttles Utilizing a Pair of Facing Foamed-Rubber Pads.** G. Marcora, Tradate, Italy.

2,276,421. **Blood Transfusion and Storage Apparatus.** C. W. Ross, Victoria, assignor to Elliotts & Australian Drug Pty. Ltd., Sydney, N. S. W., both in Australia.

2,276,469. **Finishing Wheel Comprising an Inflatable Pad Having Spaced Ribs Arranged to Produce a Bumping Effect on a Work Piece.** R. W. Cummings, Beverly, Mass., assignor to United Shoe Machinery Corp., Borough of Flemington, N. J.

2,276,494. **Web Feeding Apparatus Utilizing a Soft Rubber Roller.** E. W. Kellogg, Moorestown, N. J., assignor to Radio Corp. of America, a corporation of Del.

2,276,502. **Inflation Valve with a Resilient and Deformable Body.** W. C. McCoy, Shaker Heights, O., assignor to General Tire & Rubber Co., Akron, both in O.

2,276,516. **Automobile Cushion Having Spiral Springs with End Coils Encased in a Resilient Sheath.** N. Roy, Miami, Fla.

2,276,556. **Windshield Wiper.** M. Zaiger, Swampscott, Mass.

2,276,570. **Roller Skate with Solid Rubber Tire.** C. N. Gaines, Oakmont, Pa.

2,276,609. **Uniform with Elastic Back Panel.** E. Cadous, Brooklyn, N. Y.

2,276,622. **Bearing Seal for Rotary Shafts.** J. M. Leake, Toledo, O.

2,276,700. **Safety Armor for Airplanes Comprising a Metal Covering, a Two-Ply Rubber Sheet, a Woven Wire Netting, a Spring Mattress, and a Cushion Lining Filled with Feathers for the Mattress.** G. Provenzano, Greenwich, Conn.

2,276,892. **Method of Incorporating an Elastic Yarn in a Knitted Fabric.** E. St. Pierre, Pawtucket, assignor to Hemphill Co., Central Falls, both in R. I.

2,276,894. **Elastic Heel Support for Backless Slippers.** M. Vardy, New York, N. Y.

2,276,973. **Insulated Electric Heater Having a Resistor Wire Coated with a Non-Corrosive Material Having a High Electrical Resistivity and Comprising an Intimate and Homogeneous Mixture of Magnesium Oxide and Magnesium Borate as Essential Binding Elements thereof.** H. D. Holler, Export, assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, both in Pa.

2,277,012. **Sock with a Top Band Knitted in Two Halves Having Elastic Threads Incorporated therein.** F. Blount, Delper, England.

2,277,068. **Pantie Girdle with Crotch Portion Provided with a Slide Fastener.** E. F. Bullocii, Pasadena, Calif.

2,277,116. **Adhesive for Envelope Flap Consisting of Rubber and Paraffin Wax.** T. H. Krueger, Shelton, Conn.

2,277,145. **Reenforcing Cable Consisting of a Plurality of Metallic Filaments Provided with a Rubber Covering,** the Rubber Being in Contact with the Entire Surface of the Filament Except Where the Filaments Have Point Contact with Each Other. R. C. Pierce, Niles, Mich., assignor to National-Standard Co.

2,277,168. **Spherical Resilient Door Holder Compressible to a Flat Shape When in Use between Door Bottom and Floor.** E. E. Strom, Ely, Minn.

2,277,195. **Window Wiper.** E. J. Alpaugh, New York, N. Y.

2,277,227. **Garment Band Comprising a Strip of Rubber Enclosed in a Thin Stretchable Textile Material.** H. Hardie, assignor to Faultless Mfg. Co., both of Baltimore, Md.

2,277,263. **Stabilizing Mechanism for Railway Trucks with Rubber Friction Members.** H. E. Tucker, assignor to J. R. Cardwell, both of Chicago, Ill.

2,277,395. **Diaphragm Valve with Thick Resilient Diaphragm.** G. E. Franck, Riverside, assignor to Imperial Brass Mfg. Co., Chicago, both in Ill.

2,277,397. **Hose Connector Construction and Hose Embedded with Wire Strands.** A. M. Graham, Beverly Hills, assignor to W. G. L. Smith, Los Angeles, both in Calif.

2,277,402. **Belt Conveyer with Flexible Rubber Rollers Supporting the Belt.** H. Hoeck, Gand, Belgium.

2,277,500. **Casing or Drill Pipe Spinning Rope Comprising an Elongated Member Formed of Rubber, a Flexible Metal Member Embedded in the Rubber, and Vacuum Suction Cup Recesses on One of the Faces of the Rubber Member.** P. F. Murray, Montebello, assignor to R. P. Cooney, Los Angeles, both in Calif.

2,277,604. **Solid Rubber-Tired Wheel Construction.** G. H. Orr, assignor to General Tire & Rubber Co., both of Akron, O.

2,277,666. **Bicycle Fender Splash Guard.** W. C. Jackson, Rahway, N. J., assignor to Tingley-Reliance Rubber Corp., a corporation of N. J.

2,277,713. **Resilient-Bodied Thread Protector for an Internally Threaded Outlet.** A. L. Parker, Cleveland, O.

2,277,750. **Valve with a Ring of Resilient Ma-**

terial Having Its Upper Edge Vulcanized to an Annular Lower Flange. M. A. Enquist, Sugar Land, Tex.

2,277,766. **Stocking with Strain-Absorbing Fabric Incorporating Elastic Yarn.** F. Klumpp, Weehawken, N. J.; by Klumpp, executrix of F. Klumpp, deceased, assignor to Robert Reiner, Inc., a corporation of N. J.

2,277,772. **Electrically Heated Wearing Apparel.** L. Marick, Grosse Pointe Farms, Mich., assignor to United States Rubber Co., New York, N. Y.

2,277,786. **Pressure Hose Containing Plies of Rubber, Fabric, and Wire.** E. Schulthess, South Orange N. J.

2,277,790. **Fish Lure with Sponge Rubber Body.** A. Sisco, Kokomo, Ind.

2,277,810. **Bearing Seal with Annulus of Yielding Resilient Material.** J. F. Zotter, assignor to Fafnir Bearing Co., New Britain, Conn.

2,277,835. **Vehicle Drive with Resilient Coupling Members Having Rubber Disks in Shear.** F. L. Alben, Pittsburgh, assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

2,277,992. **Crayon with a Rollable Rubber Cover Containing an Adhesive.** J. H. Oxley, Watertown, Mass., assignor to American Crayon Co., Sandusky, O.

2,277,994. **Athletic Headgear with a Rubber Member.** R. V. Roberts, Ann Arbor, Mich.

2,278,050. **Well Head Closure Including a Resilient Molded Body.** H. Allen and E. L. Lorehm, Houston, Tex., assignors to Cameron Iron Works, a corporation of Texas.

2,278,070. **Auxiliary Tread for Dual-Wheel Assemblies Comprising an Annulus of Triangular Cross-Section Adapted for Interposition between the Tires.** H. J. Fisher Crestline, O.

2,278,074. **Flexible Pipe Joint with Resilient Circular Gasket.** G. F. Hauf, River Forest, Ill.

2,278,075. **Rubber Folding Device for Towels, Etc.** E. H. Heckt, New York, N. Y.

2,278,083. **Container Protecting Cushion of Elastic Material.** I. N. Lowe, New York, N. Y.

2,278,088. **Resilient-Bodied Key Case.** P. G. Nelson, Cleveland Heights, O.

2,278,141. **Can End with a Sealing Composition of "Vistanex."** A. H. Warth, Baltimore, Md.

2,278,154. **Stocking Top with Elastic Yarn Selvage.** W. L. Smith, Jr., Pawtucket, assignor to Hemphill Co., Central Falls, both in R. I.

2,278,207. **Spun Glass Products Containing a Coating of Polyisobutylene and Aluminum Stearate.** K. N. Mathes, Schenectady, N. Y., assignor to General Electric Co., a corporation of N. Y.

2,278,217. **Securing Device for Assembling Juxtaposed Metal Plates, Utilizing the Resilient Distortion and Incompressibility of Rubber.** C. H. H. Rodanet, Neuilly-sur-Seine, assignor to Societe Anonyme; Jaeger-Aviation, Levallois-Perret, both in France.

2,278,292. **Game Ball Comprising a Solid Core of Air-Pervious, Compacted Fibrous Material, a Gas-Tight Rubber Wall Enveloping the Core, a Layer of Fibrous Strands Enveloping the Wall, and a Wear-Resisting Overall Rubber Cover.** W. J. Voit, Los Angeles, and L. C. Weimer, Southgate, both in Calif.; Weimer assignor to Voit.

2,278,331. **Soft Rubber Edge Seal for Metal-Faced Panels.** G. R. Meyercord, Chicago, assignor to Haskelite Mfg. Corp., a corporation of N. Y.

2,278,348. **Glass Panel Mounting Including a U-Shaped Rubber Strip.** A. E. Dutfield, Streatham Park, and E. J. Rawlings, Putney, assignors to Rawlings Mfg. Co., Ltd., all of London, England.

2,278,360. **Double Glazing Construction with Block of Resilient Material Positioned within the Frame.** W. Owen, Pittsburgh, assignor to Pittsburgh Plate Glass Co., Allegheny County, both in Pa.

2,278,366. **Electrical Conductor with Soft Rubber Sheath.** B. K. Ford, Westfield, N. J., assignor to Western Electric Co., Inc., New York, N. Y.

2,278,447. **Water Pipe Joint with a Rubber Sealing Ring for Installation between the Bell and Spigot Ends.** R. H. Hyde, Campbell, Calif.

2,278,626. **Foot Supporting and Cast Protecting Means with a Bumper Body of Resilient Material Positioned beneath the Sole of the Foot.** J. R. Vasko, Great Falls, Mont.

2,278,649. **Durable Sluggish Baseball with a Core, a Major Portion of Which Comprises a Modifying Material (Polyisobutylene, Polyalkylenesulphide, Polyxylene, Polyvinylchloride or Similar Synthetic Rubber and Resin-Like Materials).** J. B. Dickson, Northampton, and R. A. Stafford and P. E. Blanchfield, assignors to A. G. Spalding & Bros., Inc., all of Chicopee, both in Mass.

2,278,711. **Elastic Spring and Resilent Railway Wheel with Rubber Segments.** E. H. Piron, New York, N. Y., and C. F. Hirshfeld, Detroit, Mich., assignors to Transit Research Corp., New York, N. Y.

2,278,712. **Super-Resilient Wheel with Shear Spring Comprising a Disk of Elastic Plastic Material.** E. H. Piron, assignor to Transit Research Corp., both of New York, N. Y.

2,278,904. **Knitted Fabric with Elastic Yarn Incorporated in the Selvage.** E. St. Pierre, Pawtucket, assignor to Hemphill Co., Central Falls, both in R. I.

2,279,155. **Receptacle Closure and Seal with Rubber Disk.** E. R. Wright, Airdrie, Alta., Canada.

2,279,180. **Two-Way Stretch Strain Absorbing Band with Alined Relaxed Meshes Including Covered Rubber Yarn.** H. B. Snader, Temple, assignor to Vanity Fair Silk Mills, Reading, both in Pa.

2,279,181. **Stocking with Elastic Strain Absorbing Band Incorporating Relaxed Meshes Including Covered Rubber Yarn.** H. B. Snader, Temple, assignor to Vanity Fair Silk Mills, Reading, both in Pa.

2,279,206. **Elastic Fabric Edge for a Garment, Composed of Rubber and Textile Yarns and Filling Yarns of Synthetic Plastic Material.** N. E. Randall, Sannock, R. I., assignor to Columbia Narrow Fabric Co., a voluntary association of R. I.

2,279,225. **Vibratory Screen with Rubber Buffer Means Mounted between a Rigid Member and the Screen Cloth.** A. T. Cecil, Columbus, O., assignor to Traylor Vibrator Co., a corporation of Colo.

2,279,346. **Hosiery with Elastic Lace Stitch Strain-Absorbing Means.** W. E. Sheeler, Spring Township, assignor to Berkshire Knitting Mills, Wyomissing, both in Pa.

2,279,355. **Tooth Cleaning and Gum Massaging Brush with Hollow Rubber Brush Body.** H. L. Wilensky, New York, N. Y.

2,279,383. **Continuous Electrical Wall Outlet Comprising a Strip of Flexible Insulating Material Having a Slot Extending Longitudinally of the Strip and Adapted to Receive an Outlet Plug.** G. H. Von Gehr, Chicago, Ill.

2,279,450. **Gasket for Use in Locations Exposed to the Action of Heat, Oil, Organic Solvents, and Caustic Washing Solutions, Comprising Synthetic Rubber, Asbestos Fibers, and Comminuted Cork.** L. H. Diehl, assignor to Detroit Gasket & Mfg. Co., both of Detroit, Mich.

Dominion of Canada

403,632. **Battery Separator Comprising a Sheet of Microporous Rubber with Glass Fibers Bonded thereto in Alternated Elongated Areas.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of G. E. Husle, Jr., Passaic, N. J., U. S. A.

403,637. **Tire.** Firestone Tire & Rubber Co., Akron, O., U. S. A., assignee of E. A. Roberts, Akron, and H. D. Cortts, Port Elizabeth, South Africa, co-inventors.

403,643. **Knitted Articles Provided with an Elastic Yarn Selvage.** Hemphill Co., Central Falls, assignee of E. St. Pierre, Pawtucket, both in R. I., U. S. A.

403,652. **Relief Designs for Fabric Decoration Comprising Rubber Riser Elements and Soft Expanded Rubber Filling Vulcanized to the Fabric.** National Automotive Fibres, Inc., assignee of G. R. Cunnington, both of Detroit, Mich., U. S. A.

403,656. **Method of Speeding up the Making of Pigment Pastes, Which Comprises Commingling a Pigment, a Liquid Vehicle, and a Solution of Xylol-Soluble Rubber.** Nuodex Products of Canada, Ltd., Toronto, Ont., assignee of Nuodex Products Co., Inc., Elizabeth, assignee of L. Roon, South Orange, and A. Minich, Roselle, co-inventors, all in N. J., U. S. A.

403,677. **Anesthetic Administering Apparatus, Including an Expansible Chamber.** Svenska Aktiebolaget Gasaccumulator, Stockholm, assignee of E. E. W. Andersson, Lidingo, both in Sweden.

403,678. **Anesthetic Administering Apparatus.** Svenska Aktiebolaget Gasaccumulator, assignee of D. O. A. Johannisson, both of Stockholm, Sweden.

403,709. **Lead-Sheathed High-Tension Electric Cable Having Pervious Neoprene Insulation Impregnated with Oil Insulating Material.** Northern Electric Co., Ltd., Montreal, P. Q., assignee of J. K. Webb, London, England.

403,724. **Pneumatic Axle and Hub Connection.** S. S. Gillespie and M. C. Richards, co-inventors, both of Globe, Ariz., U. S. A.

403,814. **Decorative Material with Relief Design Provided by Sponge Rubber Riser Elements Vulcanized to the Rear of the Fabric.** National Automotive Fibres, Inc., assignee of G. R. Cunnington, both of Detroit, Mich., U. S. A.

403,821. **Container Closure with Insoluble Grease-Proof Film Consisting of Chlorinated Rubber Hydrochloride.** Raolin Corp., New York, N. Y., assignee of J. W. Raynolds, Easton, and W. M. Kutz, Pittsburgh, co-inventors, both in Pa., both in U. S. A.

403,834. **Bearing with Rubber Bearing Member.** A. O. Smith Corp., Milwaukee, assignee of D. W. Sherman, Shorewood, both in Wis., U. S. A.

403,940. **Semi-Stiff Collar Comprising Fabric Plies United by a Thermoplastic Synthetic Resin** (Polymerized Styrene or Copolymer of Vinyl Acetate and Vinyl Chloride). Cluett Peabody & Co., Inc., Troy, N. Y., assignee of T. H. Swan, Pittsburgh, Pa., both in the U. S. A.

403,958. **Rubber-Bodied Inflation Valve.** General Tire & Rubber Co., Akron, assignee of W. C. McCoy, Shaker Heights, both in O., U. S. A.

403,959. **Surgical Bandage with a Pad-Carrying Vehicle Consisting of a Strip of Rubber Hydrohalide.** Golden State Supply Co., assignee of H. W. Bower, both of Los Angeles, Calif., U. S. A.

404,007. **Flexible Tube Covering for Railings, Etc.** H. Attari, assignee of V. Rendel, both of London, England.

404,018. **Windshield Glare-Shield with Suction Cup Attachments.** P. L. Bailey, Franklin, Ind., U. S. A.

404,020. **Window Pane Fastener Utilizing Rubber Stripping.** A. Best, North Ingonish, N. S.

404,083. **Covering for Wire and Cable, Comprising Glass Fibers and Stretched Fibers of a Vinyl Resin** (Conjoint Polymerization of Vinyl Acetate with Vinyl Chloride). Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of E. W. Rugeley, T. A. Feild, Jr., and J. F. Conlon, co-inventors, all of Charleston, W. Va., U. S. A.

404,087. **Fluid Sealing Unit with Rubber-Like Sleeve with Bellows Folds.** Crane Packing Co., Chicago, assignee of O. Brummer, Oak Park, both in Ill., U. S. A.

404,108. **Door Check Having a Resilient Body of Rubber-Like Material.** F. L. Jacobs Co., Detroit, Mich., U. S. A., assignee of F. J. Westrope, now deceased, in his lifetime of Pleasant Ridge, Mich.

404,148. **Crack Filling Tool with Sponge Rubber Plastic Supporting Pocket Member.** P. K. Barrett, inventor, and V. R. Lundy, assignee of one-half the interest, both of San Diego, Calif., U. S. A.

404,168. **Rubber Heel.** J. F. Anderson, Chicago, Ill., U. S. A.

404,177. **Sheet Metal Punching Machine with Rubber Cushioning Strip Secured to a Die Member.** J. S. Gay, Buffalo, N. Y., U. S. A.

404,186. **Shock-Absorbing Wheel Provided with Elastic Spokes and a Rubber Tread.** J. V. Martin, Washington, D. C., U. S. A.

404,201. **Aluminum Foil Food Wrapper Having a Coating Consisting of an Unoxidized Condensation Derivative of Rubber and a Wax.** Aluminum Co. of America, Pittsburgh, assignee of T. M. Hill, Arnold, both in Pa., U. S. A.

404,215. **Shoe Sole and Heel Comprising Cork Granules Impregnated with Latex and Dispersed through a Milled Rubber Composition.** Cambridge Rubber, Ltd., St. Remi de Napierville, P. Q., assignee of E. W. Dunbar, Hudson, Mass., U. S. A.

404,221. **Golf Ball Having a Shell Comprising a Solid Polymer of Ethylene.** Canadian Industries Ltd., Montreal, P. Q., assignee of B. J. Habgood, Manchester, England.

404,223. **Surgical Adhesive Tape with a Pressure-Sensitive Rubber Adhesive Coating on One Side and a Highly Pigmented Plasticized Cellulose Ether Composition on the Other.** Canadian Industries, Ltd., Montreal, P. Q., assignee of A. W. Bateman and R. E. Thomas, co-inventors, both of Newburgh, N. Y., U. S. A.

404,276. **Joint Assembly with Rubber Bridging the Space between Opposing Plates.** Lord Mfg. Co., assignee of H. C. Lord, both of Erie, Pa., U. S. A.

404,277. **Joint Comprising Opposing Flat Plates and Rubber-Like Material therebetween.** Lord Mfg. Co., assignee of H. C. Lord, both of Erie, Pa., U. S. A.

404,299. **Thermoplastic Sill and Door Seal.** Standard Products Co., Detroit, Mich., assignee of J. S. Reid, Shaker Heights, O., U. S. A.

404,352. **Rubber Mitt with Surface Configurations.** H. E. Tompkins, Tillsonburg, Ont.

404,367. **Synthetic Rubber Oil Seal.** Chicago Rawhide Mfg. Co., assignee of H. L. Northup and J. Agger, co-inventors, all of Chicago, Ill., U. S. A.

404,368. **Elasticized Bathing Suit.** Cole of California, Inc., formerly West Coast-Manchester Mills, Inc., assignee of M. Fellegi, both of Los Angeles, Calif., U. S. A.

404,372. **Pneumatic Cushion.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of J. E. O'Dell and C. D. Mason, co-inventors, both of Mishawaka, Ind., U. S. A.

404,438. **Inflatable Safety Tube with Air-Control Means for Controlling the Flow of Air between the Two Chambers.** Wingfoot Corp., Wilmington, Del., assignee of C. J. Burkley, Akron, O., both in the U. S. A.

404,439. **Dual-Chambered Safety Tube with a Valve Adapted to Supply Fluid to Both Chambers at a Different Rate.** Wingfoot Corp., Wilmington, Del., assignee of C. H. Zimmerman, Akron, O., both in the U. S. A.

404,440. **Pneumatic Float for Aircraft.** Wingfoot Corp., Wilmington, Del., assignee of J. F. Cooper, B. J. Schnitzer, and M. L. Flickinger, all of Akron, O., both in the U. S. A.

PROCESS

United States

2,275,582. **Method of Making a Tire Mold Which Includes Molding a Matrix of Vulcanized Rubber, Positioning Metallic Inserts in Depressions in the Tread Portion of the Matrix, Electro Forming a Metal Shell upon the**

Matrix and Inserts, and Removing the Shell with the Inserts Embedded therein. A. W. Bull, Grosse Pointe, Mich., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,275,658. **Making Coreless Golf Balls** by Winding a Tensed Elastic Element around a Collapsible Hollow Center Filled with an Easily Liquefiable Solid Material, Liquefying the Material, Hypodermically Withdrawing It thereby to Collapse the Center, and Completing the Ball Winding. D. G. Slovin, Providence, R. I., assignor to United States Rubber Co., New York, N. Y.

2,275,814. **Coating Films of Rubber Hydrochloride** with a Hot Melt Composition Comprising Wax and Rubber. A. Abrams, and G. W. Forcey, both of Wausau, and C. L. Wagner, Menasha, assignors to Marathon Paper Mills Co., Rothschild, all in Wis.

2,275,957. **Coating and Laminating Paper** with a Vinyl Resin, the Paper Being Easily Frangible at Ordinary Temperatures without Detriment to Either the Vinyl Resin or the Paper. F. Groff, Lakewood, O., assignor to Carbide & Carbon Chemicals Corp., a corporation of N. Y.

2,276,248. **Reclaiming Rubber** by Dampening a Broken-Down Fiber-Containing Waste Rubber Stock with Ammonium Chloride, Converting the Semi-Dry Mass to a Semi-Plastic Condition with Partial Disintegration of the Fibers, and, without the Necessity of Washing or Drying, Milling the Partially Disintegrated Fiber and Rubber Stock Whereby to Disperse Uniformly the Fibers throughout the Mass. W. G. Kirby, Naugatuck, Conn., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,282,022. **Electro - Forming Pneumatic Tire Molds.** J. W. Bishop, Detroit, and A. W. Bull, Grosse Pointe, both in Mich., assignors, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,282,169. **Imparting a Decorative Effect to a Fabric, Utilizing a Thick Ply of Uncured Rubber Vulcanized to the Rear Surface of the Fabric.** G. R. Cunnington, Grosse Pointe Park, assignor to National Automotive Fibres, Inc., Detroit, both in Mich.

2,282,274. **Making a "Vinyon" Bandage by Covering Rubber Strands, While in a Stretched Condition, with "Vinyon" in a Moist Condition to Form Yarns with Elastic Cores, and Forming a Fabric therefrom.** A. H. and F. Weiswasser, both of Philadelphia, Pa.

United Kingdom

543,137. **Process for Electrodepositing Iron and Electrolyte therefor.** United States Rubber Co.

543,490. **Textile Yarns or Cords.** Firestone Tire & Rubber Co., Ltd., M. M. Heywood, and T. R. Hartley.

543,603. **Surface Powdering of Rubber Coated Fabric or Paper.** Dubrule, Fatus & Cie.

543,779, 543,781, 543,785, and 543,786. **Leather-Like Materials.** Swears & Wells, Ltd., and K. Dressel.

543,963. **Game Balls.** Ora Holding Soc. Anon.

MACHINERY

Dominion of Canada

404,046. **Tire Regrooving Tool.** R. I. Van Alstine, Philadelphia, Pa., U. S. A.

404,409. **Carpet Making Apparatus, Including Means for Sifting Cut Fibers Downwardly on to an Advancing, Adhesive Coated Web.** National Automotive Fibres, Inc., Detroit, Mich., assignee of H. P. Faris, Philadelphia, Pa., and D. W. Yochum and R. B. Logan, both of Trenton, N. J., co-inventors, all in the U. S. A.

404,437. **Machine for Splicing an Inner Tube.** Wingfoot Corp., Wilmington, Del., assignee of J. F. Campbell, Cuyahoga Falls, and J. F. Ringlein, Akron, both in O., both in the U. S. A.

United Kingdom

543,170. **Apparatus and Process for Manufacturing Mattresses, Etc.** United States Rubber Co.

543,448. **Apparatus and Method for Sealing Joints in Cabins, Etc.** Dunlop Rubber Co., Ltd., and G. W. Trowbridge.

543,489. **Vulcanizing Presses.** McNeil Machine & Engineering Co.

543,655. **Means for and Method of Vulcanization.** J. A. W. Llewellen.

543,662. **Methods of Forming Tire Inner Tubes Or Other Inflatable Articles.** A. H. Stevens (Dill Mfg. Co.).

543,711. **Apparatus and Method for Separating Textile Material from Rubber.** T. J. Masse.

543,921. **Device for the Production of Sponge Rubber Cushions and the Like.** United States Rubber Co.

543,955. **Bias Cutter for Sheet Material.** Firestone Tire & Rubber Co.

CHEMICAL

United States

2,275,466. **Preparation of Unsaturated Alcohol Esters.** M. A. Pollack, Akron, and A. G. Chenicek, Barberton, both in O., assignors to Pittsburgh Plate Glass Co., Allegheny County, Pa.

2,275,467. **Preparation of Unsaturated Alcohol Esters of a Polycarboxylic Acid.** M. A. Pollack, Akron, and A. G. Chenicek, Barberton, both in O., assignors to Pittsburgh Plate Glass Co., Allegheny County, Pa.

2,275,469. **Method of Chlorinating Rubber,** Which Comprises Reacting Gaseous Chlorine with Rubber Dispersed in Dilute Anhydrous Solution While the Solution Is in Contact with Metallic Copper. J. W. Raynolds and G. A. Webb, both of Pittsburgh, Pa., assignors to Raolin Corp., Charleston, W. Va.

2,275,951. **Preparation of Modified Rubber Derivatives or Resins** Consisting in Reacting Maleic Anhydride with Rubber and a Compound Consisting of Styrene, Vinyl Acetate or α-Methacrylic Ester. E. H Farmer, Radlett, assignor to British Rubber Producers' Research Assn., London, both in England.

2,276,023. **Production of 1, 3-Butadiene,** Which Comprises Leading a Mixture of n-Dichlor Butane and Vaporized Hydrochloric Acid through a Reaction Vessel Heated to Temperatures Exceeding 500° C., But Below Those at Which Splitting of the Carbon Chain Occurs. M. Mueller-Cunradi, Ludwigshafen-on-the-Rhine, A. Cantzler, Mannheim, and H. Krekeler, Ludwigshafen-on-the-Rhine, both in Germany, assignors, by mesne assignments, to Jasco, Inc., a corporation of La.

2,276,030. **Increasing the Amenability of Solid Resinous Linear Condensation Polymers** (Polyamides, Polyesters, or Polyanhydrides Derived from Carboxylic Acids) to Dyeing by Subjecting the Composition to the Action of an Alkaline Solution Containing Hypochlorite Ions. A. L. Dubeau, Lewiston, J. D. MacMahon, Niagara Falls, and G. P. Vincent, New York, assignors to Mathieson Alkali Works, Inc., New York, N. Y., all in N. Y.

2,276,156. **Manufacture of 1-Cyano-1, 3-Butadiene** Which Comprises Reacting 4-Chloro-1, 2-Butadiene or 4-Bromo-1, 2-Butadiene with a Water-Soluble Ionizable Cyanide While the Butadiene Compound Is in Aqueous Emulsion. A. S. Carter and F. W. Johnson, assignors to E. I. du Pont de Nemours & Co., all of Wilmington, Del.

2,280,484. **Reclaiming of Vulcanized Rubber Scrap by Heating It in the Presence of a Condensation Product of a Monoaryl Hydrazine and a Member of the Group Consisting of Aldehydes and Ketones at a Temperature of about 100-160° C.** W. Gumlich, Leverkusen-Schlebusch, Germany, assignor, by mesne assignments, to General Aniline & Film Corp., New York, N. Y.

2,280,795. **Pigments Comprising Rutile Titanium Dioxide.** S. S. Cole and W. K. Nelson, both of Metuchen, N. J., assignors to National Lead Co., New York, N. Y.

2,280,860. **Flexible Waterproofing Coating Composition Comprising a Homogeneous Jelly-Like Mass Consisting of Swollen Colloidal Rubber and a Wax Dispersion therein.** W. H. Smyer, Westfield, N. J., assignor to Standard Oil Development Co., a corporation of Del.

2,281,087. **Producing Rubber Cement in a Short Time, by Dispersing Rubber in a Non-Aqueous Solvent and Boiling the Dispersion under Reflux in the Presence of Metallic Copper for a Period of about Two Hours.** W. M. Kutz, Pittsburgh, Pa., assignor to Raolin Corp., New York, N. Y.

2,281,096. **Unsaturated Halogen-Containing Compounds.** W. Engs, Piedmont, Calif., Herbert P. A. Groll, Hamburg-Wellingsbuttel, Germany, and A. W. Fairbairn, Oakland, Calif., assignors to Shell Development Co., San Francisco, Calif.

2,281,252. **Condensation Product of Styrene and Aryl Ethers Consisting of a Mixture of Isomeric Mono-Phenylethyl-Diphenyl Ethers.** F. B. Smith and H. W. Moll, assignors to Dow Chemical Co., all of Midland, Mich.

2,281,355. **Improvement in the Process for Producing Rubber Hydrochloride Whereby Heat Is Transferred into the Mass of Rubber Hydrochloride and Hydrogen Chloride Is Released from the Mass without Being Absorbed by the Liquid, and Recovering the Hydrogen Chloride.** H. F. Irving and F. E. Williams, assignors to Marbon Corp., all of Gary, Ind.

2,281,375. **Electrical Insulation Comprising a Vulcanized Mixed Polymer of Butadiene and Acrylic Acid Nitrile, and a Partially Depolymerized Mixed Polymer of Butadiene and Styrene as a Plasticizer therefor.** P. Nowak, Berlin-Charlottenburg, Germany, assignor to General Electric Co., a corporation of N. Y.

2,281,436. **Stable Rubber Hydrochloride Composition Containing 0.5% to 12% Polyethylene Polyamine Aliphatic Acid Salt Based on the Rubber Hydronalide.** A. Hershberger, Buffalo, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,281,437. **Age Resistant Rubber Hydrochloride Stabilized with 5% of Its Weight of Benzyl Trimethyl Ammonium Stearate.** A. Hershberger, Buffalo, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,281,613. **Polymerizing Butadiene Hydrocarbons** in the Presence of Mercaptans Having at Least Six Carbon Atoms in Aliphatic Linkage. H. Wollthan, Marl-Drewer, and W. Becker, Cologne-Mulheim, both in Germany, assignors to Jasco, Inc., a corporation of La.

2,281,768. **Photopolymerization of Vinyl Halides.** J. Heerema and J. S. Owens, assignors to Dow Chemical Co., all of Midland, Mich.

2,281,911. **Separation of Isobutylene from Hydrocarbon Mixtures.** L. A. Bannon and H. G. Schneider, both of Roselle, N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,281,940. **Coating Composition Consisting of 100 Parts of Polymerized Isobutylene, One Part of Stearic Acid, 10 Parts of Ethyl Cellulose, 20 Parts of Paraffin Wax, and a Pigment.** R. R. Lewis, Baldwin, assignor to Vulcan Proofing Co., Brooklyn, both in N. Y.

2,282,002. **Incorporating Polymerized Aliphatic Mono-Olefins in Polymerized Styrene.** T. R. Scott and M. C. Field, both of London, England, assignors to International Standard Electric Corp., New York, N. Y.

2,282,026. **Treatment of Crude Polyvinyl Acetal Resins.** B. C. Bren, Verona, and J. H. Hopkins and G. H. Wilder, both of Arlington, all in N. J., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,282,057. **Purification and Stabilization of Crude Polyvinyl Acetal Resins.** J. H. Hopkins and G. H. Wilder, both of Arlington, N. J., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

TRADE MARKS

United States

393,995. **Undergard.** Dress shields. I. B. Kleinert Rubber Co., New York, N. Y.

393,996. **Bolero.** Dress shields. I. B. Kleinert Rubber Co., New York, N. Y.

394,080. Representation of a native tapping a rubber tree, and the initials: **"RFC"** on the tree trunk. Rubberized waterproof fabrics. Rubber Fabrics Corp., New York, N. Y.

394,124. **Lynco.** Cushions for arches, heels, corns, bunions, crutch arms, and splints. Kleistone Rubber Co., Inc., Warren, R. I.

394,139. **Ty-Bands.** Rubber bands. W. H. Spencer, doing business as Alliance Rubber Co., Alliance, O.

394,147. Representation of toys projecting from an "Uncle Sam" high hat, and the words: **"Toy M'F'RS. U.S.A."** and **"American Toys"** above and below the hat. Toys. Toy Manufacturers of the U. S. A., Inc., New York, N. Y.

394,156. **Nu-Stay.** Rubberized cotton fabric for facing fur skins. Nu-Stay Process Corp., New York, N. Y.

394,240. **NoMar.** Rubber desk shoes and cups. Bassick Co., Bridgeport, Conn.

394,428. **Ranchero.** Belts, suspenders, and garters. M. Slifka & Sons, New York, N. Y.

394,464. **Tall Gals!** Shoes. Shoecraft, Inc., New York, N. Y.

394,486. **Click-Click.** Raincoats, raincapes, topcoats, and sportcoats. M. H. Siegel, Baltimore, Md.

394,502. **"Ladyform."** Foundation garments, etc. Milady Brassiere & Corset Co., Inc., New York, N. Y.

394,505. Representation of two concentric circles with the words: **"Geo. Ineichen"** superimposed thereon. Shoes, soles, heels, and leather belts. Vardaman Shoe Co., St. Louis, Mo.

394,518. **Kay Lynn.** Clothing, including girdles. Cavendish Trading Corp., New York, N. Y.

394,543. **Syntone.** Insecticidal spray. United States Rubber Co., New York, N. Y.

394,570. **Xanette.** Undergarments, including corsets. Nana Inc., New York, N. Y.

394,579. **Lancrest.** Shoes. Lansburgh & Bro., Washington, D. C.

394,601. **K.** Finger pads, elastic bands, erasers, and finger cots (stationery). Kay Rubber Co., New York, N. Y.

394,626. **"Feather-Lite."** Foundation garments, etc. Neatform Co., Inc., New York, N. Y.

394,646. **In the California manner.** Clothing, including shoes. Gude's, Inc., Los Angeles, Calif.

394,772. **R.** Prophylactics. Gotham Sales Co., Inc., New York, N. Y.

394,824. **Garden Club.** Hose. B. F. Goodrich Co., New York, N. Y.

394,830. Representation of a model of the isoprene molecule. Rubberized fabrics and waterproof fabrics. Aldan Rubber Co., Philadelphia, Pa.

394,849. **Bradley's.** Paste, rubber cement, and bookbinding tape. Milton Bradley Co., Springfield, Mass.

394,937. **Jim Penney.** Clothing, including shoes, suspenders, garters, etc. J. C. Penney Co., Wilmington, Del.

16,000 REPRINTS

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INDIA RUBBER WORLD

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Equipment for Accelerated Light Aging of Rubber and Methods of Evaluation of Ultra-Violet Light and Sunlight

T. A. Werkenthin, David Richardson, R. F. Thornley, and R. E. Morris

A TYPICAL REPRINT

THE REASON

Articles appearing in INDIA RUBBER WORLD are recognized by the members of the rubber industry throughout the world as authoritative—written by men who know. The publication is the only one in its field edited by graduate engineers with long practical experience in rubber manufacturing. Its editorial prestige has been maintained through 53 years of service to this one industry.

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WRITE FOR MARKET AND CIRCULATION DATA AND RATES

INDIA RUBBER WORLD

386 FOURTH AVE. ESTABLISHED 1889 NEW YORK

Market Reviews

Fixed Government Prices*

Plantation Grades

	Price Per Lb.
No. 1-X R.S.S. in cases	$0.22½
No. 1 Thin Latex Crepe	.23⅝
No. 2 Thick Latex Crepe	.23⅜
No. 1 Brown Crepe	.21⅞
No. 2 Brown Crepe	.21⅝
No. 2 Amber	.21⅝
No. 3 Amber	.21⅜
Rolled Brown	.17½

*For a complete list of government prices see our June, 1942, issue, p. 254.

New York Market Rubber Quotations

		June 26, 1941	May 22, 1942		June 22, 1942	
Latex		(Dollars and Cents)				
Normal and concentrated (solid content)	lb.	.30	.35	.2825	.29	.2825 .29
Paras †						
Upriver fine	lb.	.27¾				
Upriver fine	lb.	*.29½				
Upriver coarse	lb.	.16				
Upriver coarse	lb.	*.22				
Islands fine	lb.	.27				
Islands fine	lb.	*.29				
Acre, Bolivian fine	lb.	.28				
Acre, Bolivian fine	lb.	*.30				
Beni, Bolivian fine	lb.	.28				
Madeira fine	lb.	.27¾				
Caucho †						
Upper ball	lb.	.16				
Upper ball	lb.	*.22				
Lower ball	lb.	.15½				
Pontianak						
Pressed block	lb.	.15	.26	‡	‡	
Guayule						
Ampar	lb.	.15½				
Africans						
Rio Nuñez	lb.	.19	.20		.225	
Black Kassai	lb.	.19	.20		.225	
Prime Niger flake	lb.	.28	.28		.35	
Gutta Percha						
Gutta Siak	lb.	.18½	‡		‡	
Gutta Soh	lb.	.29	‡		‡	
Red Macassar	lb.	1.35	2.75		3.00	
Balata						
Block Ciudad Bolivar	lb.	.47	‡		‡	
Manaos block	lb.	.50	‡		‡	
Surinam sheets	lb.	.52	‡		‡	
Amber	lb.	.54	‡		‡	

*Washed and dried crepe. Shipments from Brazil. †These Brazilian rubbers have been taken over by the Rubber Reserve Co., and no prices have as yet been set. ‡None available at present.

RECLAIMED RUBBER

DEMAND for reclaimed rubber in June continued heavy in volume, with available supplies approaching a critical shortage as the rubber industry sought increasing amounts for accelerated war production. Jesse Jones, Secretary of Commerce, testifying before a House Interstate and Foreign Commerce subcommittee, said that reclaiming output has recently been increased to a rate of 26,000 tons a month. Improved methods may step up the rate to 35,000 tons a month, he added. Joseph E. Pogue, of the Advisory Committee on Economics, addressing the quarterly meeting of the Interstate Oil Compact Commission, at Lexington, Ky., June 20 estimated that about 1,000,000 tons of scrap rubber could be collected by methods involving sustained incentives, but that a single drive would yield considerably less. About 3,500,000 tons of scrap rubber have been generated in excess of that reclaimed in the past ten years, he computed, but pointed out that this gross figure could not accurately be reduced to a net amount because it was impossible to make reliable deductions of the percentages destroyed, dispersed beyond recall, and that part of no value for reclaiming. In the 10 years ending with 1940, 1,289,000 tons, or 26.9% of the total 4,794,000 long tons crude consumed, was reclaimed. In 1941 crude consumption was about 800,000 tons, and reclaim production was 256,000 tons, a ratio of 32%.

Amendment No. 10 to Supplementary Order No. M-15-b, (see pages 361, 374), issued and effective June 19, prohibits the importation of reclaimed rubber, rubber scrap, and other items except by subsidiaries of the RFC.

Ceiling prices for reclaim follow:

New York Quotations

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6½ / 6¾
Acid	1.18-1.22	7½ / 7¾
Shoe		
Standard	1.56-1.60	7 / 7¼
Tubes		
Black	1.14-1.26	11¼ / 11½
Gray	1.15-1.26	12½ / 13¼
Red	1.15-1.32	12 / 12¼
Miscellaneous		
Mechanical blends	1.25-1.50	4½ / 5½
White	1.35-1.50	13½ / 14½

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

RUBBER SCRAP

SOME improvement in collection of rubber scrap in June was reported since the advent of warmer weather in the northern part of the country and in Canada. Potential sources of increased supply are the worn rubber equipment of our expanded military and naval forces and the discarded rubber articles of our allies. Approximately 400,000 tons of scrap rubber were collected in 1941, from which 300,000 tons of reclaim were processed. This year scrap collection has been reported at an annual rate of only 250,000 tons.

A total of 218,988 tons of rubber scrap collected through June 27 in the nationwide drive was reported as disappointing by government heads. The campaign, conducted June 15 to July 10, is under the direction of the Bureau of Industrial Conservation, WPB. Cooperating agencies were the Office of the Petroleum Coordinator and the Petroleum Industry War Council. The material sold by citizens to filling stations for 1¢ a pound was collected by oil-company trucks and stored by the Rubber Reserve Co., which will allocate it to reclaiming plants at the direction of the WPB. All scrap rubber except battery boxes and tire beads was accepted by the Rubber Reserve Co. at $25 per short ton for mixed scrap and mixed tires carload lots at point of shipment. The excess resulting from the difference paid the citizen ($20 a short ton) and the price paid to the oil companies by the government will be given to designated charities. Industrial scrap, as differentiated from scrap recovered by private citizens, could be sold either to the oil companies at bulk distributing stations or through regular trade channels. The campaign was expected to uncover a large amount of miscellaneous scrap which will necessitate an involved job of sorting and grading. Most authorities agreed that the campaign would result in collections great enough to supply immediate needs.

Consumers Buying Prices

(As of June 20, 1942)

		Prices	
Inner Tubes*†			
No. 2 passenger tubes	lb.	$0.07¾	/$0.08
Red passenger tubes	lb.	.07½	/ .07¾
Mixed passenger tubes	lb.	.06¾	/ .07
Tires			
Pneumatic Standard*‡			
Mixed passenger tires	ton	18.00	/19.00
Beadless passenger tires	ton	24.00	/25.50
No. 2 light colored carcass	ton	50.00	/52.50
No. 1 passenger peelings	ton	47.50	/50.00
Solid Tires			
Clean mixed truck	ton	46.00	/50.00
Light gray	ton	55.00	/60.00
Boots and Shoes			
Boots and shoes, black	lb.	.01½	/ .01⅝
Colored	lb.	.01¾	/ .01⅞
Untrimmed arctics	lb.	.01¾	/ .01⅞
Mechanicals			
Mixed black scrap	ton	32.00	/35.00
Hose, air brake	ton	32.00	/34.00
Garden, rubber covered	ton	15.00	/20.00
Steam and water, soft	ton	15.00	/20.00
No. 1 red	lb.	.05¼	/ .05¾
No. 2 red	lb.	.04½	/ .05
White druggists' sundries	lb.	.04¾	/ .05
Mixed mechanicals	lb.	.05	/ .04½
White mechanicals	lb.	.04¾	/ .05
Hard Rubber			
No. 1 hard rubber	lb.	.16	/ .17

*Ceiling prices. Higher price refers to premiums. †East of Rockies. ‡Akron.

(For revised price ceiling issued June 27, see page 404.)

Rubber Trade Inquiries

The inquiries below are of interest not only in showing the needs of the trade, but because additional information may be furnished by readers. The Editor is glad to have those interested communicate with him.

No.	Inquiry
2877	Suppliers of rubber coating for used or worn rubber footwear.
2878	Suppliers of hard rubber stock suitable for molding purposes.
2879	Manufacturers of balata and gutta percha Atlantic cables.
2880	Names of concerns who buy old rubber tires; also debeaded tires and carcasses.
2881	Supplier of Red Boot Cement.

It Will Take
PLENTY OF SCRAP RUBBER
to Finish the Scrap

●

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AUTHORIZED BUYING AGENTS FOR RUBBER RESERVE COMPANY

COMPOUNDING INGREDIENTS

KEY materials needed for war production are becoming scarcer as supplies of some are diminishing as the result of increasing demands. It is expected that chemicals for production of civilian goods will become progressively tighter during the next few months, but, reportedly, there will continue to be sufficient quantities in virtually all lines for war uses. Prices in June, in most cases, held to previous levels.

CARBON BLACK. Improved demands were reported as a result of slight increases in synthetic rubber production and notwithstanding curtailment of production in some of the smaller rubber plants. Orders for some types of black were said to exceed manufacturing capacity, and for these a shortage is expected when some of the large synthetic plants now under construction begin production. Demand for other types was unusually light. Prices are firm.

CLAY. Shipments declined to a considerable extent, and no great increase in movement in the near future appears likely. Prices held steady.

FACTICE OR RUBBER SUBSTITUTE. The call as an extender for crude, reclaim, and synthetic rubber continues at levels established in the past few months. Prices remain stable.

LITHARGE. Offerings were in substantial volume in an active market. Prices are steady.

LITHOPONE. Movement continued in good volume, but under allocation as stocks are reportedly light. Prices were maintained at previous levels.

RUBBER CHEMICALS. Rubber restriction requirements have apparently stabilized the demand, and the market is holding steady at a figure proportionate with the reduced rubber usage. There is evidence of considerable interest in synthetic rubber chemicals. Some prices are lower.

RUBBER SOLVENTS. Demand continues fairly heavy. Available stocks for the normal trade are restricted by OEM rulings. Prices are firm.

TITANIUM PIGMENTS. The call was brisk, and the takings by normal users at fair levels despite heavier absorption by war industries. Prices are firm.

ZINC OXIDE. Rubber plants are still adjusting inventories on some grades to the point where they come within government regulations. An increased demand is expected in the autumn as the rubber industry approaches peak war production. But the demand for the duration, it is believed, will be considerably less than it was in 1939.

Maximum Price Regulation No. 166, issued June 17 and effective June 22, restored the maximum price for leaded zinc oxides containing 35% or more lead to the April 1 level of 7¢ a pound. The General Maximum Price Regulation by "inadvertent omission" had reduced the price on such oxides to 6.75¢ a pound. Prices are steady.

Current Quotations*

Abrasives

Pumicestone, powdered	lb.	$0.035	$0.04
Rottenstone, domestic	lb.	.025	

Accelerators, Inorganic

Lime, hydrated, *l.c.l.*, New York	ton	$25.00	
Litharge (commercial)	lb.	.09	
Magnesia, calcined, heavy	lb.		
technical, light	lb.	.0625	$0.07

Accelerators, Organic

A-1	lb.	.26	.35
A-10	lb.	.36	.42
A-19	lb.	.52	.65
A-32	lb.	.60 /	.70
A-46	lb.	.50 /	.57
A-77	lb.	.42 /	.55
A-100	lb.	.42 /	.55
Accelerator 49	lb.		
808	lb.	.60 /	.62
833	lb.	1.15	
Acrin	lb.	.65	
Aldehyde ammonia	lb.	.65 /	.70
Altax	lb.	.43	.45
Amazate	lb.	1.53	
B-J-F	lb.	.40 /	.45
Beutene	lb.	.59	.64
Butasan	lb.	1.15	
Butazate	lb.	1.13	
Butyl Eight	lb.	.97	.99
C-P-B	lb.	1.95	
Captax	lb.	.38	.40
D-B-A	lb.	1.95	
Delac A	lb.	.39	.48
O	lb.	.39	.48
P	lb.	.39	.48
Di-Esterex-N	lb.	.50 /	.57
DOTG (Di-ortho-tolyguanidine)	lb.	.44 /	.46
DPG (Diphenylguanidine)	lb.	.36	
El-Sixty	lb.	.40 /	.47
Ethasan	lb.	1.15	
Ethazate	lb.	1.13	
Ethylideneaniline	lb.	.42 /	.43
Formaldehyde P.A.C.	lb.	.06 /	.0625
Formaldehyde-para-toluidine	lb.	.65	
Formaniline	lb.	.36 /	.37
Guantal	lb.	.40 /	.50
Hepteen	lb.	.34	.39
Base	lb.	1.25	1.40
Hexamethylenetetetramine U.S.P.	lb.	.30	
Technical	lb.	.33	
Lead oleate, No. 999	lb.	.14	
Witco	lb.	.15	
Ledate	lb.	1.48	
Methasan	lb.	1.25	
Methazate	lb.	1.23	
Monex	lb.	1.53	
Morlex "33"	lb.	.67	.72
"55"	lb.	.96	1.01
O-X-A-F	lb.	.40 /	.45
Oxynone	lb.	.77 /	.90
Para-nitroso-dimethylaniline	lb.	.85	
Pentex	lb.	.74	.84
Flour	lb.	.1225	.1325
O	lb.		
Flour	lb.		
Phenex	lb.	.49 /	.54
Pipazate	lb.	1.53	
Pip-Pip	lb.	1.65	
R & H 50-D	lb.	.42 /	.43
Rotax	lb.	.48	.50
Safex	lb.	1.15 /	1.25
Santocure	lb.	.60 /	.67
Selenac	lb.	1.98	
SPDX	lb.	.69 /	.74
A	lb.	.69 /	.74
Super sulphur No. 2	lb.	.13 /	.15
Tetrone A	lb.	2.20	
Thiocarbanilide	lb.	.28 /	.33
Thionex	lb.	1.53	
Thiurad	lb.	1.55	
Trimene	lb.	.54	.64
Base	lb.	1.03	1.18
Triphenylguanidine (TPG)	lb.	.45	
Tuads, Methyl	lb.	1.53	
2-MT	lb.	.75	
Ultra	lb.	.99 /	1.04
Ureka	lb.	.50 /	.57
Blend B	lb.	.50 /	.57
C	lb.	.48 /	.55
Vulcanex	lb.	.42 /	.43
Z-B-X	lb.	2.45	
Zenite	lb.	.40 /	.42
A	lb.	.45 /	.47
B	lb.	.42 /	.44
Zimate, Butyl	lb.	1.13	
Ethyl	lb.	1.13	
Methyl	lb.	1.23	
Zipacel	lb.	1.65	

Activators

Aero Ac 50	lb.		
Barak	lb.	.50	
MODX	lb.	.295 /	.345
SL No. 20	lb.	.1089/	.1135

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of known ingredients. Requests for information not recorded will receive prompt attention.

Age Resisters

AgeRite Alba	lb.	$1.95	$2.05
Gel	lb.	.56	.58
Hipar	lb.	.64	.66
Powder	lb.	.48	.50
Resin	lb.	.48	.50
D	lb.	.48	.50
White	lb.	1.23	1.33
Albasan	lb.	.69	.74
Aminox	lb.	.48	.57
Antox	lb.	.54	.56
Betanox	lb.	.48 /	.57
B-L-E	lb.	.48	.57
Powder	lb.	.64	.73
B-X-A	lb.	.48	.57
Copper Inhibitor X-872-A	lb.	1.15	
Flectol H	lb.	.52 /	.65
White	lb.	.90 /	1.15
M-U-F	lb.	1.48	
Neozone (standard)	lb.	.61	.63
A	lb.	.48 /	.50
C	lb.	.48 /	.50
D	lb.	.48 /	.50
E	lb.	.61	.63
Oxynone	lb.	.77 /	.90
Permalux	lb.	1.18	1.20
Santoflex B	lb.	.52 /	.65
BX	lb.	.58 /	.71
Santovar A	lb.	1.15 /	1.40
Stabilite	lb.	.48 /	.69
Alba	lb.	.50 /	.74
Thermoflex A	lb.	.64 /	.66
C	lb.	.58 /	.60
Tysonite	lb.	.16 /	.165
V-G-B	lb.	.48	.57

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 *lbs.*	2.70 /	3.55
liquid, 50%	100 *lbs.*	1.95	
solid (700-*lb. drums*)	100 *lbs.*	2.30 /	3.15

Antiscorch Materials

Antiscorch T	lb.	.90	
Cumar RH	lb.	.105	
E-S-E-N	lb.	.34	.39
R-17 Resin (*drums*)	lb.	.1075	
RM	lb.	1.25	
Retarder W	lb.	.36	
Retardex	lb.	.445 /	.475
U-T-B	lb.	.34	.39

Antisun Materials

Heliozone	lb.	.23 /	.24
S.C.R.	lb.	.32 /	.34
Sunproof	lb.	.2275	.2775
Jr.	lb.	.165 /	.215

Blowing Agents

Ammonium Carbonate, lumps (500-*lb. drums*)	lb.		
Unicel	lb.	.50	

Brake Lining Saturant

B.R.T. No. 3	lb.	.0175/	.0185

Colors

Black

Du Pont powder	lb.	.42	
Lampblack (commercial), *l.c.l.*	lb.	.15	

Blue

Du Pont Dispersed	lb.	.35 /	3.95
Powders	lb.	2.25 /	3.75
Heliogen BKA	lb.		
Toners	lb.		

Brown

Mapico	lb.	.31	

Green

Chrome	lb.	.25	
oxide (*freight allowed*)	lb.	.24	
Du Pont Dispersed	lb.	.98 /	2.85
Powders	lb.	1.00	
Guignet's (*bbls.*)	lb.	.70	
Toners	lb.		

Orange

Du Pont Dispersed	lb.	.88 /	2.35
Powders	lb.	2.75 /	3.05
Toners	lb.		

Orchid

Toners	lb.		

Pink

Toners	lb.		

Purple

Toners	lb.		

Red

Antimony			
Crimson, 15/17%	lb.		
R. M. P. No. 3	lb.	.48	
Sulphur free	lb.		
R.M.P.	lb.	.52	
Golden 15/17%	lb.		
7-A	lb.	.37	
Z-2	lb.	.25	
Cadmium, light (400-*lb. bbls.*)	lb.	.80 /	.85
Du Pont Dispersed	lb.	.93 /	2.05
Powders	lb.	.60 /	1.65
Iron Oxide, *l.c.l.*	lb.		
Mapico	lb.	.0975	
Rub-Er-Red (*bbls.*)	lb.	.0975	
Toners	lb.		

Lithopone (*bags*)	lb.	$0.0425	/$0.045
Albalith	lb.	.0425	/ .045
Astrolith (50-*lb. bags*)	lb.	.0425	/ .045
Azolith	lb.	.0425	/ .045
Titanium Pigments			
Kay-bar	lb.	.055	/ .065
Kay-cal	lb.	.0525	/ .0625
Rayox	lb.	.135	/ .165
Titanolith (50-*lb. bags*)	lb.	.056	/ .0585
Titanox-A	lb.	.145	/ .175
B	lb.	.0575	/ .0625
30	lb.	.0575	/ .0625
C	lb.	.055	/ .06
M	lb.	.0575	/ .0625
RC	lb.	.055	/ .06
RC-HT	lb.	.055	/ .06
Ti-Tone	lb.		
Zopaque (50-*lb. bags*)	lb.	.145	/ .1525
Zinc Oxide			
Azo ZZZ-11	lb.	.0725	/ .075
44	lb.	.0725	/ .075
55	lb.	.0725	/ .075
66	lb.	.095	/ .0975
French Process, Florence			
Green Seal-8	lb.	.09	/ .0925
Red Seal-9	lb.	.085	/ .0875
White Seal-7	lb.	.095	/ .0975
Kadox, Black Label-15	lb.	.0725	/ .075
No. 25	lb.	.085	/ .0875
72	lb.	.0725	/ .075
bel -17	lb.	.0725	/ .075
Horse Head Special 3	lb.	.0725	/ .075
XX Red-4	lb.	.0725	/ .075
23	lb.	.0725	/ .075
72	lb.	.0725	/ .075
78	lb.	.0725	/ .075
80	lb.	.0725	/ .075
103	lb.	.0725	/ .075
110	lb.	.0725	/ .075
St. Joe (lead free)			
Black Label	lb.	.0725	/ .075
Green Label	lb.	.0725	/ .075
Red Label	lb.	.0725	/ .075
U.S.P.	lb.	.105	/ .1075
Zinc Sulphide Pigments			
Cryptone-BA-19	lb.	.056	/ .0585
BT	lb.	.056	/ .0585
CB	lb.	.056	/ .0585
MS	lb.	.0575	/ .06
ZS No. 20	lb.	.0825	/ .085
86	lb.	.0825	/ .085
230	lb.	.0825	/ .085
800	lb.	.0825	/ .085
Sunolith	lb.	.0425	/ .045

Yellow

Cadmolith (cadmium yellow), (400-*lb. bbls.*)	lb.	.55	/ .60
Du Pont Dispersed	lb.	1.25	/ 1.85
Powders	lb.	.70	/ 1.75
Mapico	lb.	.0725	
Toners	lb.		

Dispersing Agents

Bardex	lb.	.0425	/ .045
Bardol	lb.	.025	/ .0275
B	lb.	.05	/ .0525
Darvan No. 1	lb.	.30	/ .34
No. 2	lb.	.30	/ .34
No. 3	lb.	.30	/ .34
Nevoll (*drums, c.l.*)	lb.	.0225	
Santomerse S	lb.	.11	/ .25

Extenders

Extendex C	lb.		
Naftolen	lb.	.15	/ .20
Vanzak	gal.	.05	/ .06

Fillers, Inert

Asbestine, *c.l.*	ton	20.00	
Asbestos Fiber	ton	15.50	/48.00
Barytes	ton	40.00	
f.o.b., St. Louis (50-*lb. paper bags*)	ton	25.55	
off color, domestic	ton	29.00	
white, domestic	ton	38.50	
Blanc fixe, dry, precip.	ton	80.00	
Calcene	ton	37.50	/43.00
Infusorial earth	lb.	.0225	
Kalite No. 1	ton	76.00	
3	ton	86.00	
Kalvan	ton	100.00	
Magnesium Carbonate, *l.c.l.*	lb.	.0725	
Paradene No. 2 (*drums*)	lb.	.0525	
Pyrax A	ton	7.50	
Whiting			
Columbia Filler	ton	9.00	/14.00
Suprex White	ton	32.50	
Witco, *c.l.*	ton	8.00	

Finishes

Black-Out (surface protective)	gal.	4.50	/ 5.00
Mica, *l.c.l.*	ton		
Rubber lacquer, clear	gal.	1.00	/ 2.00
colored	gal.	2.00	/ 3.50
Shoe varnish	gal.	1.45	
Talc	ton	25.00	

Flock

Cotton flock, dark	lb.	.09	/ .11
dyed	lb.	.40	/ .80
white	lb.	.12	/ .20
Rayon flock, colored	lb.	1.00	/ 1.50
white	lb.	.75	/ 1.00

Latex Compounding Ingredients

Accelerator 552	lb.	$1.65	
Aerosol OT Aqueous 10%	lb.		
Antox, dispersed	lb.	.54	
Aquarex D	lb.	.75	
F	lb.	.85	
MDL Paste	lb.	.25	
Areskap No. 50	lb.	.18	/$0.24
100, dry	lb.	.39	/ .51
Aresket No. 240	lb.	.16	/ .22
300, dry	lb.	.42	/ .50
Aresklene No. 375	lb.	.35	/ .50
400 dry	lb.	.51	/ .65
Black No. 25, dispersed	lb.	.22	/ .40
Casein	lb.		
Collocarb	lb.	.07	
Color Pastes, dispersed	lb.	.75	/ 1.10
Copper Inhibitor X-872	lb.	2.25	
Dispersex No. 15	lb.	.11	/ .12
No. 20	lb.	.08	/ .10
Factex Dispersion A	lb.	.17	
Heliozone, dispersed	lb.	.25	
MICRONEX, Colloidal	lb.	.06	/ .07
R-2 Crystals	lb.	1.55	/ 1.70
S-1 (400-*lb. drums*)	lb.	.65	
Santobrite Briquettes	lb.		
Powder	lb.		
Santomerse D	lb.	.41	/ .65
S	lb.	.11	/ .25
Sodium Stearate	lb.	.40	
Stablex A	lb.	.90	/ 1.10
B	lb.	.70	/ .90
C	lb.	.40	/ .50
Sulphur, dispersed	lb.	.10	/ .15
No. 2	lb.	.08	/ .12
T-1 (440-*lb. drums*)	lb.	.40	
Tepidone	lb.	.63	
Tetrone A	lb.	2.20	
Zenite Special	lb.	.47	
Zinc oxide, dispersed	lb.	.12	/ .15

Mineral Rubber

Black Diamond, *l.c.l.*	ton	25.00	/30.00
B.R.C. No. 20	lb.	.0105	/ .0115
Hydrocarbon, Hard	lb.	25.00	/27.00
Parmr	ton		
Pioneer, *c.l.*	lb.	25.00	/27.00
285°-300°	ton	25.00	/27.00

Mold Lubricants

Aluminum Stearate	lb.	.21	/ .24
Aquarex D	lb.	.75	
MDL Paste	lb.	.25	
Colite	gal.	.90	/ 1.15
Lubrex	lb.	.25	/ .30
Mold Paste	lb.	.12	/ .30
Rubber-Glo, conc. regular	gal.	.94	/ 1.15
Type W	gal.	.99	/ 1.20
Sericite	ton	65.00	
Soapstone, *l.c.l.*	ton	22.50	
Zinc Stearate	lb.	.28	/ .31

Oil Resistant

A-X-F	lb.	.82	/ .85

Reclaiming Oils

B.R.V.	lb.	.035	/ .0375
C-10	gal.	.19	/ .24
D-4	gal.	.17	/ .22
E-5	gal.	.15	/ .20
No. 1621	lb.	.021	/ .0235
S.R.O.	lb.	.02	/ .0225
Type C (for synthetic rubber)	gal.	.33	/ .38
X-159	gal.	.29	

Reenforcers

Carbon Black			
Aerfloted Arrow Specification (*bags only*)	lb.	.0355†	
Arrow Compact Granulized	lb.	.0355†	
Certified Heavy Compressed (*bags only*)	lb.	.0355†	
Spheron	lb.	.0355†	
Continental, dustless	lb.	.0355†	
"AA"	lb.		
Compressed (*bags only*)	lb.	.0355†	
Disperso	lb.	.0355†	
Dixie	lb.	.0355†	
Dixiedensed	lb.	.0355†	
66	lb.	.0355†	
Furnex	lb.	.035	
Beads	lb.	.035	
Gastex	lb.	.035	/ .06
HX	lb.	.0355†	
Kosmobile	lb.	.0355†	
66	lb.	.0355†	
Kosmos	lb.	.0355†	
Dixie 20	lb.	.035†	
MICRONEX Beads	lb.	.0355†	
Mark II	lb.	.0355	
Standard	lb.	.0355	
W-5	lb.	.0355	
W-6	lb.	.0355	
P-33	lb.	.0475	
Pelletex	lb.	.035	/ .06
Thermax	lb.	.0225	
"S"	lb.	.0675	
TX	lb.	.0355†	
Velvetex	lb.	.04	/ .06
"WYEX BLACK"	lb.	.0355†	

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is $0.033 per pound. All prices are carlot.

Carbonex Flakes	lb.	$0.03	/$0.035
S	lb.	.031	/ .036
Plastic	lb.	.031	/ .0335
Clays			
Aerfloted Hi-White	ton	11.00	
LGB	ton	15.00	
Paragon (50-*lb. bags*)	ton	10.00	
Suprex (50-*lb. bags*)	ton	11.00	/23.50
Catalpo, *c.l.*	ton	30.00	
China	ton	25.00	
Crown	ton	11.00	
Dixie	ton	11.00	
"L"	ton		
Langford	ton	8.50	
McNamee	ton	10.00	
Par	ton	11.00	
Paraforce, *c.l.*	ton	50.00	
Witco, *c.l.*	ton	10.00	
Cumar EX	lb.	.05	
MH	lb.	.065	/ .115
V	lb.	.095	/ .125
465 Resin	lb.		
"G" Resin	lb.		
Nevindene	lb.		
Silene	lb.	.04	/ .045

Reodorants

Amora A	lb.		
B	lb.		
C	lb.		
D	lb.		
Curodex 19	lb.		
188	lb.		
198	lb.		
Rodo No. 0	lb.	4.00	/ 4.50
10	lb.	5.00	/ 5.50

Rubber Substitutes

Black	lb.	.085	/ .13
Brown	lb.	.085	/ .1375
White	lb.	.09	/ .15
Factice			
Amberex Type B	lb.	.1875	
Brown	lb.	.085	/ .1375
Fac-Cel B	lb.	.15	
C	lb.	.15	
Neophax A	lb.	.165	
B	lb.	.165	
White	lb.	.09	/ .15

Softeners and Plasticizers

B.R.T. No. 7	lb.	.02	/ .021
Bondogen	lb.	.98	/ 1.05
Bunnatol (for synthetic rubber)	lb.	.40	/ .50
Burgundy pitch	lb.		
Copene Resin	lb.	.32	
Cycline oil	gal.	.14	/ .20
Dipolymer Oil	gal.	.33	/ .38
Dispersing Oil No. 10	lb.	.0375	/ .04
LX-436 (*tank car*)	lb.	.027	
Myristilene	lb.	.20	/ .30
Nevinol	lb.	.13	/ .14
Nuba resinous pitch (*drums*)			
Grades No. 1 and No. 2	lb.	.029	
3-X	lb.	.0425	
Nypene Resin	lb.	.32	
Palm oil (Witco), *c.l.*	lb.		
Palmalene	lb.	.15	/ .25
Palmol	lb.	.16	
Para Flux (reg.)	gal.	.17	/ .18
No. 2016	gal.	.135	/ .19
Para Lube	lb.	.046	/ .048
Paradene No. 1 (*drums*)	lb.	.0525	
Special (*drums*)			
20 to 35° C. M.P.	lb.	.0625	
35 to 45° C. M.P.	lb.	.0625	
45 to 75° C. M.P.	lb.	.0575	
Piccocizer "30"	lb.		
Piccolyte Resins	lb.	.15	/ .185
Piccoumaron Resins	lb.	.045	/ .15
Pine tar	gal.		
Oil	gal.		
Plastogen	lb.	.0775	/ .08
Plastone	lb.	.27	/ .30
R-19 Resin (*drums*)	lb.	.1075	
21 Resin (*drums*)	lb.	.1075	
Reogen	lb.	.115	/ .12
RPA No. 2	lb.	.65	
3	lb.	.46	
4	lb.	.80	
Tackol	lb.	.085	/ .18
Tonox	lb.	.50	/ .59
Witco No. 20, *l.c.l.*	gal.	.20	
X-1 resinous oil (*tank car*)	lb.	.011	

Softeners for Hard Rubber Compounding

Resin C Pitch 45°C. M.P.	lb.	.015	/ .016
60°C. M.P.	lb.	.015	/ .016
75°C. M.P.	lb.	.015	/ .016

Solvents

Beta-Trichlorethane	lb.	.20	
Carbon Bisulphide	lb.		
Tetrachloride	gal.		
Cosol No. 1	gal.	.26	
No. 2	gal.	.25	
No. 3	gal.	.22	
Industrial 90% benzol (*tank car*)	gal.	.15	
Picco	gal.	.22	/ .32
Skellysolve	gal.		

Stabilizers for Cure

Barium Stearate	lb.	.29	/ .32

Calcium Stearate	lb.	$0.26	$0.27
Laurex (*bags*)	lb.	.1475	.1725
Lead Stearate	lb.		
Magnesium Stearate	lb.	.29 /	.32
Stearex B	lb.	.1525 /	.1625
Beads	lb.	.145 /	.155
Stearic acid, single pressed	lb.	.1525 /	.1625
Stearite, *c.l.*	lb.	.1450	
Zinc Laurate	lb.	.29 /	.32
Stearate	lb.	.29 /	.31

Synthetic Rubber

Neoprene Latex Type 56	lb.	.30	
57	lb.	.30	
60	lb.	.36	
Neoprene Type CG	lb.	.70	
E	lb.	.65	
FR	lb.	.75	
G	lb.	.70	
GN	lb.	.65	
I	lb.	.70	
KN	lb.	.75	
M	lb.	.65	
Synthetic 100	lb.	.41	
"Thiokol" Type "A"	lb.	.35	
"FA"	lb.	.50	
"RD"	lb.	.70	

Tackifier

B.R.H. No. 2	lb.	.02 /	.021
LX-433 (*tank car*)	lb.	.068	
P.H.O. (*drums*)	lb.	.24	

Vulcanizing Ingredients

Magnesia, light (for neoprene)	lb.	.26	
Sulphur	100 lbs.		
Chloride (*drums*)	lb.	.04	
Telloy	lb.	1.75	
Vandex	lb.	1.75	

(See also Colors—Antimony)

Waxes

736 (clear)	gal.	1.25	
737 (black)	gal.	1.35	
1515-A (black)	gal.	1.35	
Carnauba, No. 3 chalky	lb.		
2 N.C.	lb.		
3 N.C.	lb.		
1 Yellow	lb.		
2	lb.		
Carnube	lb.	.56 /	.66
Monten	lb.	.12 /	.17
Rubber Wax No. 118, Neutral	gal.	.91 /	1.46
Colors	gal.	1.01 /	1.56

Scrap Prices Revised

Acting to smooth out distortions in the scrap rubber market, Price Administrator Leon Henderson on June 27 announced issuance of Revised Price Schedule No. 87 as Amended, which brings prices to consumers for all kinds of scrap rubber into line with the maximums already established on tires, tire parts, and tubes. The Administrator emphasized that the ceiling order in no way affects either Rubber Reserve Co.'s offer to buy scrap tires and miscellaneous scrap rubber at $25 a ton in carload lots at any shipping point in the country, or the price paid to individuals by filling stations and other collection agents in the national campaign.

By relating the maximum prices that reclaimers and other consumers may pay for all scrap to the prices that prevailed for tire and tube scrap in the final quarter of 1941, this extension of the price ceiling, together with the government's program for scrap rubber collection, will facilitate reclamation of substantial amounts of the nation's scrap supplies.

In drawing up the new schedule of maximum prices to consumers, the OPA took into consideration the Rubber Reserve Co.'s recently announced offer to buy scrap tires and miscellaneous scrap rubber at $25 a ton in carload lots at any shipping point. This offer by the Reconstruction Finance Corp. subsidiary will afford sufficient inducement to bring out scrap rubber which dealers might have found unprofitable to collect and ship to reclaimers under the ceiling levels for sales to consumers established in the amended Schedule.

The effect of the Rubber Reserve Co.'s offer and the amended Schedule, considered together, is to assure to scrap sellers a ready and remunerative market, and at the same time to stabilize the raw material cost of reclaimers.

Rubber Reserve's offer grew out of the necessity, in the present rubber shortage, to comb remote areas for the vitally needed scrap. Prior to Pearl Harbor, the industry had always been able to obtain adequate supplies from areas within short shipping distances of the reclaiming plants. Since scrap must now be gathered from farther afield, heavy freight charges, amounting in some instances to more than $15 a ton, will be incurred, in addition to all the expenses incident to collection in sparsely settled areas.

With scrap now salable at all points of shipment at a substantial price, the collector is relieved of the shipping expense which in some cases was prohibitive of sales.

Prices on kinds of scrap rubber not under the ceilings set in Price Schedule 87, before the present amendment, advanced steadily until the General Maximum Price Regulation went into effect, the Price Administrator declared, reflecting both speculative activity and the necessity of drawing on remote areas for additional supplies. Sales of solid tires have been reported at $70 a ton, against $34 prior to Pearl Harbor. Air bags, obtained exclusively from rubber factories, advanced from $13 a ton in December to $35 in March. Such price increases, halted at March levels by the General Maximum Price Regulation, have established unsound price relations and created disorder in the scrap rubber market. Revised Price Schedule No. 87 as Amended places ceilings on sales to consumers of all kinds of scrap rubber, as far as practicable at the levels which prevailed during the last quarter of 1941.

The amendment puts 28 additional kinds of scrap rubber under the schedule, which heretofore has applied only to tires, tire parts and tubes. Prices for these remain unchanged.[1] However, three new grades have been added to Table 1: *passenger dykes* (maximum prices at consuming centers, dollars per short ton), Akron, $24; Buffalo, $23.50; Naugatuck, $22.12; East St. Louis, $22; Memphis, $20.88; Gadsden, $19; Los Angeles, $16.50; *truck dykes*, $24, $23.50, $22.12, $22, $20.88, $19, $16.50, respectively; and *solid tires*, $34, $33.50, $31.50, $31, $29.50, $27, $23.50.

Prices on the additional grades of scrap follow:

Kind of Scrap Rubber	Maximum Prices at All Consuming Centers Dollars per Short Ton
Buffings	$35.00
Bicycle tires	15.00
Passenger tire beads	5.00
Truck tire beads	7.00
Air bags and water bags	15.00
Air brake hose	25.00
Miscellaneous hose	17.00
Mats and matting	15.00
Rubber boots and shoes	33.00
No-mark soles and trimmings	35.00
Black soles and trimmings	32.00
Rubber heels	16.00
Black mechanical scrap, above 1.10	20.00
General household and industrial scrap	15.00

	Cents per Pound
Black mechanical scrap, 1.10 or below	5
Light colored mechanical scrap, 1.10 or below	10
Light colored mechanical scrap, 1.30 or below	5
Light colored mechanical scrap, 1.50 or below	4½
Light colored mechanical scrap, above 1.50	4
White or light colored friction scrap, unprocessed	10
Black or mixed friction scrap, unprocessed	6
White or light colored friction scrap, processed	12½
Black or mixed friction scrap, processed	8½
Other unvulcanized scrap rubber, white or light colored	18
Other unvulcanized scrap rubber, black or mixed	9

In amending the Schedule, OPA withdrew a previous provision of the order which permitted a consumer to pay, besides the listed ceiling prices for scrap tires, the actual freight charges in excess of $8 a ton. Now that there is a remunerative market for scrap at every shipping point, need no longer exists for the extra freight charge provision to encourage collection. The premium for large deliveries likewise has been withdrawn.

Effective date of Revised Price Schedule 87 as amended is June 26.

The Schedule will be printed in full in our next issue.

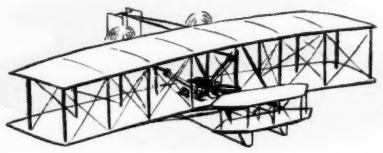
[1] See India Rubber World, Mar., 1942, p. 584.

Goodyear has placed in operation the "GTM Industrial Rubber Products Conservation Service" designed to prolong the life of belting, hose, rubber-lined installations, and other industrial rubber products. The service by Goodyear technical men is free.

Rims Approved and Branded by Tire & Rim Association

Rim Size	May, 1942
15" and 16" D. C. Passenger	
16x3.00E	20,467
16x4.50E	6,223
16x5.00E	4,301
16x5.00F	7,695
16x5.50F	1,738
16x6.00F	2,499
17" and over D. C. Passenger	
18x2.15B	16,172
Military	
16x4.50CE	81,045
16x6.50CS	43,285
20x6.00CT	8,596
22x6.00CT	10
Flat Base Truck	
20x3.75P (5")	4,861
17x4.33R (6")	1,199
20x4.33R (6")	11,328
15x5.00S (7")	4,136
20x5.00S (7")	314,301
15x6.00T (8")	1,185
18x6.00T (8")	11,378
20x6.00T (8")	23,308
22x6.00T (8")	21,956
20x7.33V (9-10")	16,981
22x7.33V (9-10")	1,263
24x7.33V (9-10")	1,507
20x8.37V (11")	1,860
24x8.37V (11")	414
Tractor and Implement	
17x3.25E	286
20x3.25E	536
20x4.50E	493
13x5.50F	6,078
24x8.00T	1,677
Cast	
24x13.00	145
24x15.00	131
Total	617,054

Pioneers



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WARWICK Chemical Company

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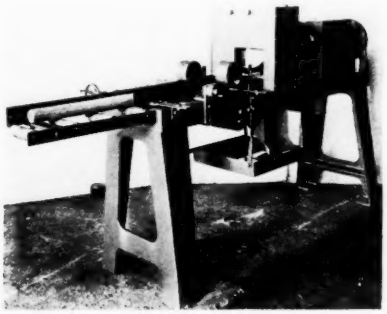

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Regular and Special Constructions of

COTTON FABRICS

Single Filling Double Filling and

ARMY Ducks

HOSE and BELTING Ducks

Drills

Selected Osnaburgs

Curran & Barry
320 BROADWAY
NEW YORK

COTTON & FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

	Apr. 25	May 30	June 6	June 13	June 20
Futures					
June	19.34	18.89	17.77	17.95	.....
July	19.44	19.02	17.90	18.08	18.24
Sept.	19.54	19.20	18.10	18.28	18.45
Dec.	19.69	19.45	18.32	18.50	18.68
Mar.	19.82	19.61	18.53	18.69	18.86
May	.....	19.71	18.60	18.79	18.96

New York Quotations

May 22, 1942

Drills

38-inch 2.00-yard	yd.	.....
40-inch 3.47-yard		.....
50-inch 1.52-yard		$0.31⅜
52-inch 1.85-yard		.25⅞
52-inch 1.90-yard		.25¼
52-inch 2.20-yard		.21477
52-inch 2.50-yard		.194
59-inch 1.85-yard		.....

Ducks

38-inch 2.00-yard D. F.		.21⅜
40-inch 1.45-yard S. F.		.29⅜
51½-inch 1.35-yard D. F.		.33½
72-inch 1.05-yard D. F.		.43
72-inch 17-21 ounce		.48⅞

Mechanicals

Hose and belting	lb.	.42¾

Tennis

51½-inch 1.35-yard	yd.	.31½
51½-inch 1.60-yard	yd.	.27⅛
51½-inch 1.90-yard	yd.	.23⅛

Hollands—White

Blue Seal

20-inch	yd.	.13½
30-inch		.24¼
40-inch		.27

Gold Seal

20-inch No. 72	yd.	.14½
30-inch No. 72		.25¾
40-inch No. 72		.29

Red Seal

20-inch	yd.	.12¼
30-inch		.22
40-inch		.24½

Osnaburgs

40-inch 2.34-yard	yd.	.15½
40-inch 2.48-yard		.14⅝
40-inch 2.56-yard		.....
40-inch 3.00-yard		.12¾
40-inch 7-ounce part waste		.15
40-inch 10-ounce part waste		.21⅜
37-inch 2.42-yard clean		.15¼

Raincoat Fabrics

Cotton

Bombazine 64 x 60	yd.	.....
Plaids 60 x 48		.....
Surface prints 64 x 60		.....
Print cloth, 38½-inch, 64 x 60		.08971

Sheetings, 40-inch

48 x 48, 2.50-yard	yd.	.16200
64 x 68, 3.15-yard		.13968
56 x 60, 3.60-yard		.11944
44 x 40, 4.25-yard		.09764

Sheetings, 36-inch

48 x 48, 5.00-yard	yd.	.08600
44 x 40, 6.15-yard		.06991

Tire Fabrics

Builder

17¼ ounce 60" 23/11 ply Karded peeler	lb.	.50

Chafer

14 ounce 60" 20/8 ply Karded peeler	lb.	.49
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.49

Cord Fabrics

23/5/3 Karded peeler, 1⅛" cotton	lb.	.50
15/3/3 Karded peeler, 1⅛" cotton	lb.	.48
12/4/2 Karded peeler, 1⅛" cotton	lb.	.49
23/5/3 Karded peeler, 1¼" cotton	lb.	.50

Leno Breaker

8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.50

THE June cotton market was characterized by marked decreases from the high closing May quotation in the first half of the month, as reflected in the price of the 15/16-inch spot middling grade which closed at 20.35¢ per pound June 1, fell to 19.13¢ per pound June 8, recovered to 19.15¢ June 10, and closed at 20.02¢ June 29. Reasons advanced for cotton's drop were heavy selling as a result of successful maneuvers by the Allied Nations on various fronts, favorable weather conditions for the growing crop, uncertainty regarding the pending Bankhead-Russell legislation requiring agricultural loans at full parity, and the cumulative effects of recent government anti-inflationary steps. The demand for futures was small because of the lack of government contracts for distant delivery, but small trade demands developed the middle of the month.

The Bureau of the Census reported a sharp decline in cotton consumption in May: 950,075 running bales, compared with 998,754 bales in April and 923,518 in May, 1941. Mill stocks on hand May 31 were 2,589,456 bales, against 2,631,889 bales April 30 and 1,931,565 bales May 31, 1941. Cotton in public storage and at compresses at the end of the month totaled 9,402,969 bales, against 10,396,962 bales April 30 and 11,399,982 bales May 31, 1941.

Fabrics

Lack of activity in the cotton market affected textiles, and trading in gray cloths in June was quiet. Government orders were in small volume compared with those of recent months. Print cloths sales were scattered and light; ducks and drills were dull. More business was done in sheetings and osnaburgs for the bag trade. Few supplies are said to be available for sale with the exception of seconds and short cuts which are speedily absorbed. January delivery is the earliest available in volume business, and producers and buyers are reported equally reluctant to do business for delivery more than six months distant. During the past month a growing tendency toward firmer market conditions was noted in ducks and the heavier-weight osnaburgs. Demand for sheetings by rubberizers has declined markedly.

Amendment No. 4 to Revised Price Schedule No. 35 (Carded Gray and Colored Yarn Goods), issued May 25, removed control of wide osnaburgs from Maximum Price Regulation No. 118 (Cotton Products). The amendment lowers the ceiling prices on osnaburgs over 42 inches wide and brings them into line with maximum prices for the cloth in narrower widths. Amendment No. 3 to Maximum Price Regulation No. 127 (Finished Piece Goods), issued June 12, exempts from that regulation any fabrics covered by Maximum Price Regulation No. 118. Amendment No. 4 to Maximum Price Regulation No. 118, effective June 12, placed industrial cloths and ten other fabric groups under definite dollars-and-cents ceilings.

Tire fabrics are up 1¢ a pound. Holland and sheeting prices are unchanged; while drills are firm. Decreases in several grades of duck were reported as well as fractional changes in osnaburgs.

Plasticizer for Synthetic Rubber

A NEW plasticizer now on the market under the trade name Piccocizer "30" reveals possibilities of extensive potentialities in the synthetic rubber program. In providing flexibility at 30° F. below zero it opens up a broad field for application in both the production of certain war needs and industrial requirements, as well as future civilian use. Tests showing complete flexibility at this low temperature were made with Hycar OR.

One of the major difficulties in quickly incorporating plasticizers in synthetic compounds has engendered some problems which apparently have been eliminated by this new product. Laboratory trials revealed its remarkable affinity for synthetic rubber. Later production runs showed its complete incorporation in seven minutes and further developed the fact that it immediately affected the affinity of synthetic rubber for other materials used in the compound. In this respect it reduced mixing time from 100 to 200% over previously used plasticizers.

Piccocizer "30" is a high-boiling polymerized aromatic oil, giving good tack. It is produced from a basic source of unlimited availability. Special developments in equipment for its manufacture have made low cost possible. Its ability to act as an incorporating vehicle for other materials also contributes substantially to lower production cost and a greater conservation of synthetic rubber without sacrifice of vital properties in the finished product. No restrictions will be imposed upon its use because its production in no way conflicts with essential war needs. Piccocizer "30" has been brought to the market by Standard Chemical Co., Akron, O., essentially as a plasticizer for synthetics.

Laboratory tests with Piccocizer "30" used in connection with Hycar OR have provided the following data:

BASIC FORMULA

Hycar OR	100.
Zinc Oxide	5.
Channel Black	50.
AgeRite Powder	1.
Stearic Acid	1.
Altax	1.5
Sulphur	1.5
Piccocizer "30"	30.

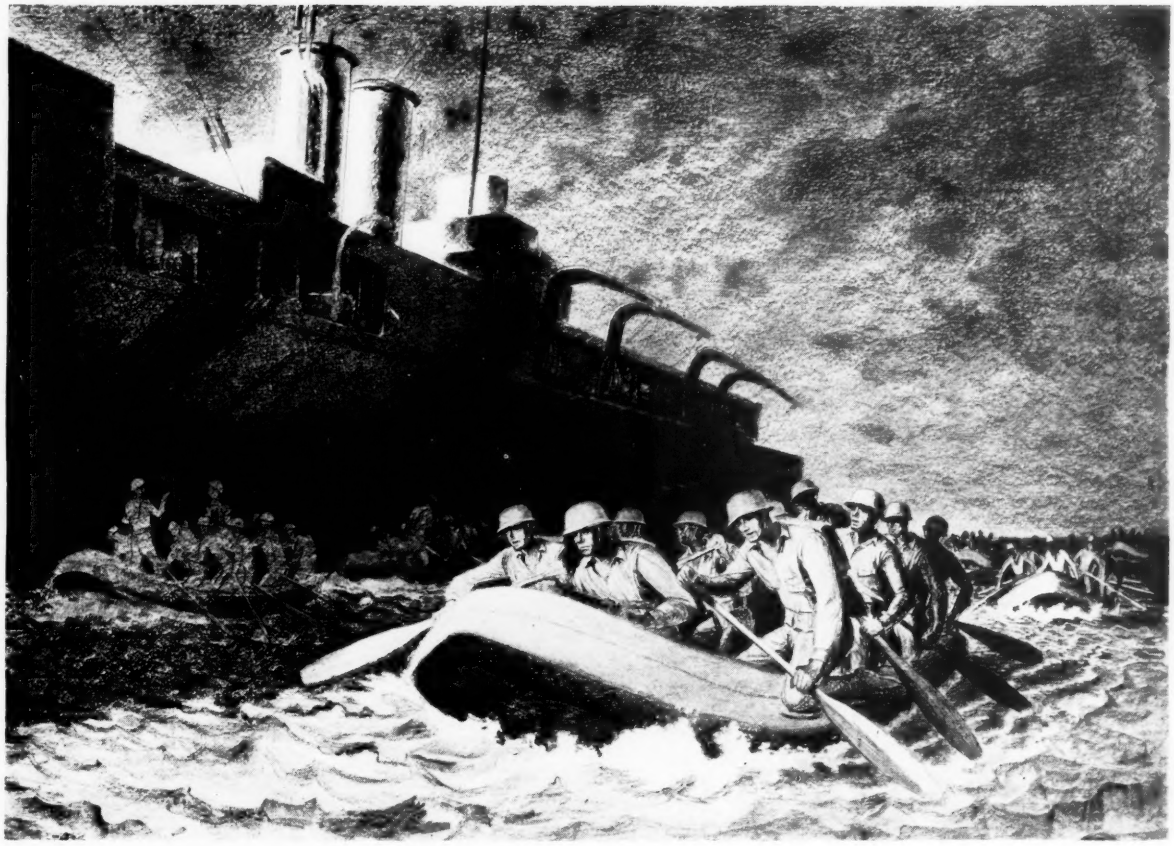
Cure	20' x 310° F.	30' x 310° F.	45' x 310° F.
Mod. @ 300%	400	600	850
Tensile	2375	3000	2975
Elongation	670	690	600
Durometer Hardness	58	58	60
Schopper Rebound	..	37	..
Low Temp. Flexibility	..	-30°	..
Time of Incorporation	..	7 Min.	..
Delta Volume 48 hrs. Hexane	..	2.3%	..

Incorporating Time:

1st—15 parts 4 minutes
2nd—15 parts 3 minutes

Comments:

Black Dispersion—Good
Milling Behavior—Good



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launched from the sea under cover of darkness play a vital part in modern warfare. Our Marines use duck covered boats of the type pictured here in their operations. Surprise is essential to the success of such raids so boats are paddled by the men rather than motor driven—Canvas covering eliminates the chance of accidental noises.

Cotton thus plays another part in equipping and protecting our Armed forces for war. And because practically all of our production is now under priority for Army and Navy use, your normal supplies of our HOSE and BELTING DUCK—SHEETING, etc. for ordinary commercial use are no longer available.

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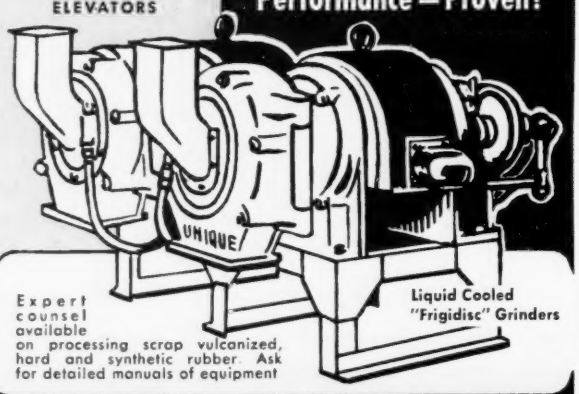

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Hardness • Elasticity • Plasticity of Rubber, etc.

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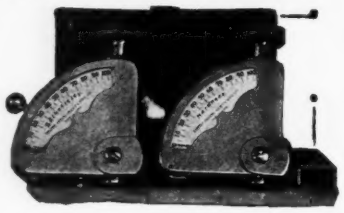
It is economic extravagance to be without these instruments. Used free handed in any position or on Bench Stands, convenient, instant registrations, fool proof. *Ask for our Descriptive Bulletins, and Price List R-4 and R-5.*



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SPECIAL LIGHT GRADE — TECHNICAL & U.S.P.
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TECHNICAL AND U.S.P. GRADES
THE PHILIP CAREY MFG. COMPANY
DEPENDABLE PRODUCTS SINCE 1873
LOCKLAND, CINCINNATI, OHIO

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

		April, 1942		Four Months Ended April, 1942	
UNMANUFACTURED		Quantity	Value	Quantity	Value
Crude rubber, etc.	lb.	.....	.....	.....	.....
Latex (dry weight)	lb.	.....	.....	.....	.....
Gutta percha	lb.	.....	.....	11,675	$ 9,598
Rubber, recovered	lb.	3,017,700	$209,257	10,427,803	711,165
Rubber, powdered, and gutta percha scrap	lb.	734,600	38,645	3,153,800	136,774
Balata	lb.	21,358	11,621	35,110	18,185
Rubber substitute	lb.	64,100	13,300	629,700	141,098
Totals		3,837,758	$272,823	14,258,085	$1,016,820
PARTLY MANUFACTURED					
Hard rubber comb blanks		.....	.....	.....	$ 375
Hard rubber, n. o. s.	lb.	4,606	$ 3,025	9,674	8,067
Rubber thread not covered	lb.	.....	.....	1,043	1,021
Totals		4,606	$ 3,025	10,717	$ 9,463
MANUFACTURED					
Bathing shoes	prs.	.....	.....	2,905	$ 1,103
Belting		.....	$ 21,347	.....	78,994
Hose		.....	24,691	.....	99,309
Packing		.....	17,243	.....	51,687
Boots and shoes	prs.	78	27	1,605	1,515
Canvas shoes with rubber soles	prs.	14,520	4,334	14,640	4,394
Clothing, including waterproofed		.....	1,432	.....	7,715
Raincoats	no.	6,582	31,458	14,621	129,555
Gloves	doz. prs.	14	404	957	3,021
Hot water bottles		.....	.....	.....	1,034
Liquid sealing compound		.....	6,375	.....	11,076
Tires, bicycle	no.	111	137	1,005	871
Pneumatic	no.	230	8,460	555	13,014
Solid for automobiles and motor trucks	no.	22	1,025	135	8,072
Other solid tires	no.	.....	1,408	.....	5,027
Inner tubes	no.	380	3,878	406	4,005
Bicycle	no.	120	63	996	340
Mats and matting		.....	11,417	.....	49,488
Cement		.....	24,205	.....	77,529
Golf balls	doz. prs.	.....	.....	5,028	10,584
Heels	prs.	2,150	101	30,182	3,078
Other rubber manufactures		.....	193,080	.....	762,494
Totals		.....	$351,085	.....	$1,323,905
Totals, rubber imports		.....	$626,933	.....	$2,359,188

Exports of Domestic and Foreign Rubber Goods

	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED				
Crude rubber	.....	.....	.....	.....
Waste rubber	$ 7,479	.....	$ 51,134	.....
MANUFACTURED				
Belting	11,679	.....	45,956	.....
Bathing caps	.....	.....	136	.....
Canvas shoes with rubber soles	12,408	.....	44,226	.....
Boots and shoes	183,899	.....	731,545	.....
Clothing, including waterproofed	22,179	.....	74,980	.....
Heels	1,098	.....	3,616	.....
Hose	13,850	.....	43,387	.....
Soles	121	.....	1,392	.....
Soling slabs	39	.....	39	.....
Tires, pneumatic	944,808	.....	4,495,151	.....
Not otherwise provided for	58,273	.....	245,144	.....
Inner tubes	98,740	.....	381,955	.....
Other rubber manufactures	6,116	.....	55,275	.....
Totals	$1,353,210	.....	$6,122,802	.....
Totals, rubber exports	$1,360,689	.....	$6,173,936	.....

Dividends Declared

COMPANY	STOCK	RATE	PAYABLE	STOCK OF RECORD
American Hard Rubber Co.	Com.	$0.25 q.	June 30	June 19
American Hard Rubber Co.	7% Pfd.	$1.75 q.	June 30	June 19
Baldwin Rubber Co.	Com.	$0.125	July 21	July 9
Crown Cork International Corp.	"A"	$0.10	July 1	June 22
Dunlop Rubber Co., Ltd. (Amer. Dep. Rec.)	Ord. Reg.	8% final	June 26	May 26
Dunlop Tire & Rubber Goods Co., Ltd.	5% 1st Pfd.	$0.625 s.	June 30	June 15
Faultless Rubber Co.	Com.	$0.875 irreg.	June 25	June 16
Flintkote Co.	Com.	$0.15	June 20	June 11
Flintkote Co.	$4.50 Cum. Pfd.	$1.125 q.	June 15	June 11
Garlock Packing Co.	Com.	$0.75	June 30	June 20
General Tire & Rubber Co.	Pfd.	$1.50 q.	June 30	June 20
Goodyear Tire & Rubber Co. of Canada, Ltd.	Com.	$0.63 q.	June 2	June 15
Goodyear Tire & Rubber Co. of Canada, Ltd.	5% Pfd.	$0.625 q.	July 2	June 15
Jenkins Bros.	Founders Shrs.	$0.50 irreg.	June 25	June 12
Jenkins Bros.	Non-Vot.	$0.125	June 25	June 12
Jenkins Bros.	7% Pfd.	$1.75 q.	June 25	June 12
Lima Cord Sole & Heel Co.	Com.	$0.10	June 30	June 20
Mansfield Tire & Rubber Co.	Com.	$0.25 q.	June 20	June 10
Mansfield Tire & Rubber Co.	Conv. Pfd.	$0.30 q.	July 1	June 15
Norwalk Tire & Rubber Co.	Com.	$1.3125 accum.	July 1	June 19

LITTLEJOHN & CO., INC.

Importers

52 Wall St., New York, N.Y.

CRUDE RUBBER

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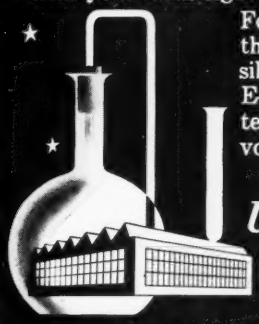
THE AKRON EQUIPMENT CO.
AKRON - OHIO

EXTEND YOUR LATEX 50% TO 150% BY THIS PROVED PROCESS

The major characteristics of the original latex are retained, including approximately the same concentration—making the extended product readily adaptable to many dipping as well as most cementing and coating operations.

Your latex can be shipped to us for processing in our own laboratories; or the "Formulated Extender" can be shipped to you for mixing with your latex right in your own plant.



For specific information on the process's extending possibilities, write Laboratory E-200—describing the materials and operations involved in your use of latex.

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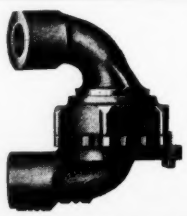

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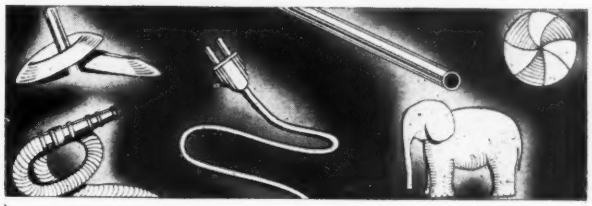

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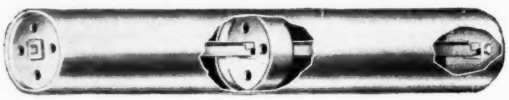

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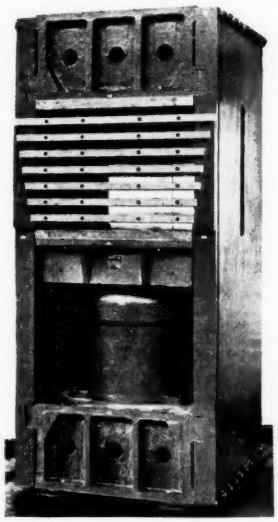

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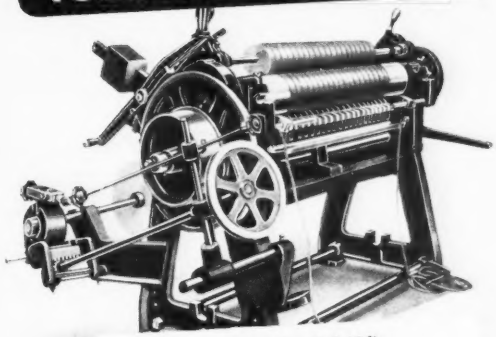

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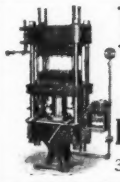

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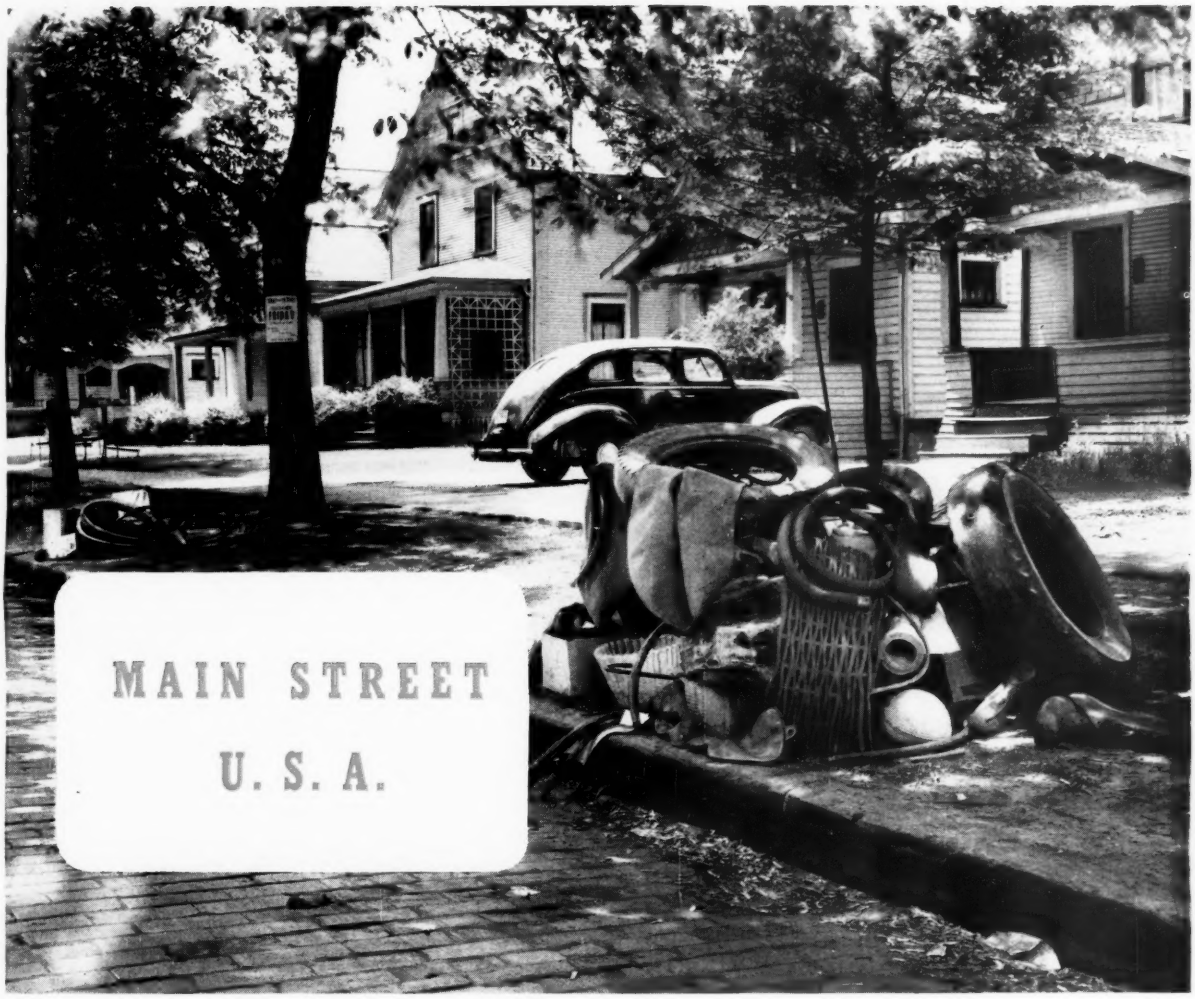

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KEEP YOUR PRODUCTION *Rolling*

with **CLIMCO PROCESSED LINERS**

★ More than ever before speed in production is essential. Today your liners must function with the greatest efficiency. You can't afford such costly delays as cutting out and repairing bad spots, rerolling for cooling, or constantly cleaning your liners between trips to the calender. Climco Processing saves this time by coating the liner with a tough, flexible glaze that insures perfect separation. ★ All the evils of stock adhesions are ended, labor and power costs drop, and the life of the liner is increased. ★ Year after year many prominent rubber companies send us repeat business. We believe their satisfaction with Climco Processing proves its value, and explains why it is worthy of a trial in your plant.

CLIMCO

LINERETTE
INTERLEAVING PAPER
Treatment Contains
NO OIL OR WAX
Samples on Request

THE CLEVELAND LINER & MFG. CO.
Cleveland, Ohio

CLIMCO PROCESSED LINERS
For Faster, Better Production at Lower Cost